THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXII. No. 1577.] LONDON, AUGUST 1, 1893. [45TH YEAR. PRICE 6d.

"TORBAY PAINTS."

THE ORIGINAL,

As supplied during the present and many preceding years to the LONDON GASLIGHT & COKE COMPANY.

	Ground in Oil Paste. Per Cwt.	Mixed ready for use. Per Cwt.
"Torbay Red Oxide" - -	22s.	26s.
"Torbay Chocolate Oxide" -	22s.	26s.
"Torbay Gas Stone Colour"	27s.	30s.

Carriage Paid to any Railway Station in England or Wales.

TORBAY & DART PAINT Co., Ld.,
DARTMOUTH, DEVON.

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES,
Manufacturing Gas Engineers.

See Advt. p. III., centre of JOURNAL.

Lanemark Coal Co.,
LIMITED.

LANEMARK CANNEL AND GAS COALS.

Quotations and Analysis on application to

LANEMARK COLLIERY,
NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

NORTON'S PATENT
"ABYSSINIAN" & ARTESIAN TUBE WELLS,
FOR TOWN WATER-WORKS AND OTHER SUPPLIES.

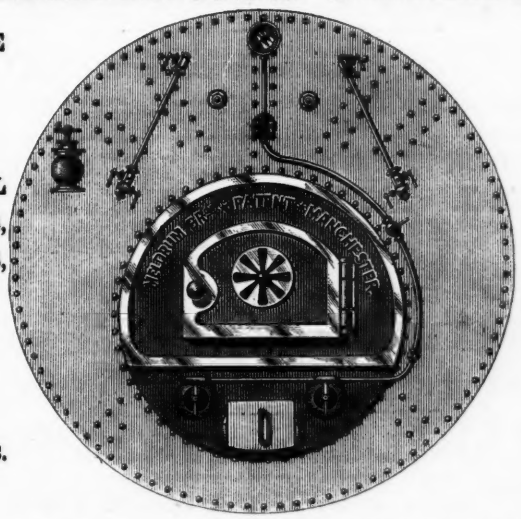
The following Town Water-Works Supplies have been obtained by this System, viz.:—Abbott's Langley, Aldershot, Alnwick, Cirencester, Hertford, Lechlade, St. Albans, Shrewsbury, Skegness, Southampton, Stony Stratford, Swansea, Wallingford, Watford, West Worthing, Wimborne, &c.

LE GRAND & SUTCLIFF,
HYDRAULIC ENGINEERS, 125, BUNHILL ROW, LONDON, E.C.

DUST-FUEL FURNACE
(MELDRUM'S PATENT).

BURNS ANY KIND OF WASTE FUEL TO ADVANTAGE.

SUPPLIED to the PRINCIPAL GAS-WORKS, WATER-WORKS, ELECTRIC LIGHT STATIONS, &c., &c.



1200 WORKING.

LONDON OFFICE:
16, UNION COURT,
OLD BROAD STREET, E.C.
WILLIAM BOBY, Agent.

MELDRUM BROS., ATLANTIC WORKS, 13, CITY ROAD, **MANCHESTER.**
Telegrams: "MELDRUM MANCHESTER." National Telephone No. 1674

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER & BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM

(ESTABLISHED 1765),

MANUFACTURER OF TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST IRON TANKS FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, and all kinds of GAS APPARATUS,

Wrought-Iron Roofs, Bridges, Girders, &c.,

Steam, Hot Water, and Range Boilers, Tanks, Cisterns, Boats, and all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, AND ESTIMATES SUPPLIED ON APPLICATION.

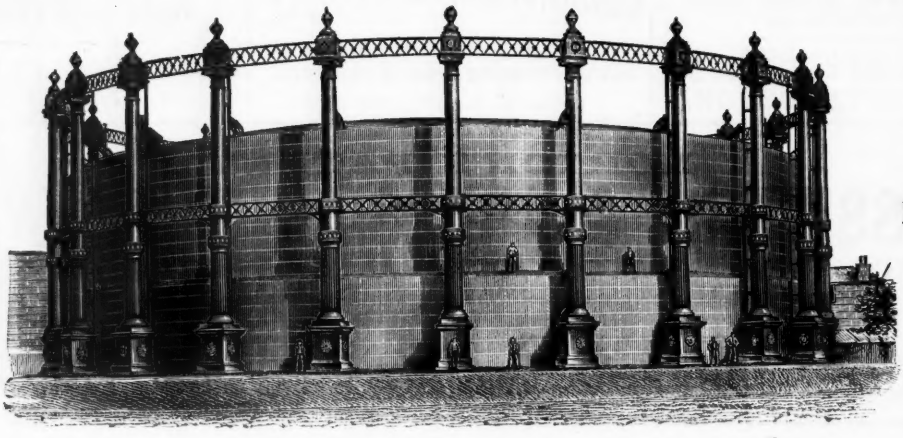
TELEGRAPHIC ADDRESS: "COCKEY'S FROME."

EDWARD COCKEY & SONS, Ld.,

ESTABLISHED OVER HALF A CENTURY.

GAS ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

Manufacturers of GASHOLDERS and TANKS, BOILERS and ENGINES, ROOFS, EXHAUSTERS, BREEZE SCREENS, CHARGING and COKE BARROWS.



Manufacturers of PATENT WASHERS, PATENT VALVES for PURIFIERS, &c., GOVERNORS, LAMP COLUMNS, Weighbridges, COKE BREAKERS.

MAKERS OF FISH & SMITH'S PATENT (NO. 5108) OVERFLOWS FOR REGULATING THE SEAL IN GAS-WASHERS, &c., AND COCKEY & SMITH'S PATENT SELF-ACTING BYE-PASS VALVES.

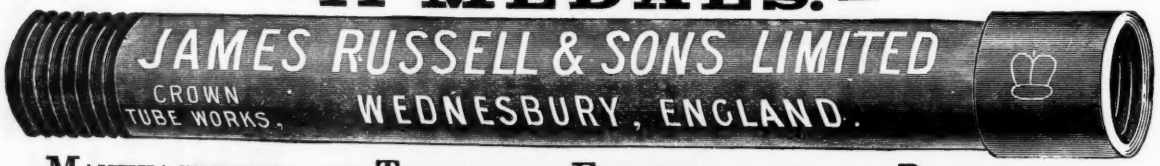
Estimates for any description of Gas Plant on application.

THE IRON-WORKS, FROME SELWOOD, SOMERSET.

London Office: 49, Fann Street, E.C.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.

—11 MEDALS.—



MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 108, Southwark Street. BIRMINGHAM: 114, Colmore Row. LEEDS: 6, Mark Lane, New Briggate.

THOMAS PIGGOTT & CO., LTD., BIRMINGHAM.

LONDON OFFICE: ST. THOMAS APOSTLE, E.C.

GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT FITTINGS, ETC.

TELEGRAPHIC ADDRESS: ATLAS, BIRMINGHAM.

WELDED & RIVETED FOUL PIPES, MAINS, RETORT LIDS, & CAST TANKS, PURIFIERS.

OVER 500 GASHOLDERS HAVE BEEN SUPPLIED AND ERECTED,

INCLUDING THOSE SUPPLIED TO THE FOLLOWING GAS COMPANIES AND CORPORATIONS:

BATH.	BOLTON.	BRISTOL.	CHELTENHAM.	LEAMINGTON.	PRESTON.	SHEFFIELD.
BELFAST.	BOMBAY.	BRISBANE.	HARTLEPOOL.	LIVERPOOL.	READING.	STOCKHOLM.
BECKTON.	BRADFORD.	CARDIFF.	LEEDS.	NOTTINGHAM.	RIO GRANDE.	SYDNEY.
BIRMINGHAM.	BRIGHTON.	COVENTRY.	LEICESTER.	OLDHAM.	SOUTH METRON.	VIENNA.

GAS COAL.

BEST

REAL OLD SILKSTONE GAS COAL,

Address THE STRAFFORD COLLIERIES COMPANY,

Near BARNSLEY, SOUTH YORKSHIRE.

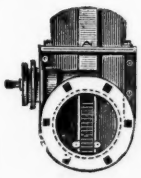
NEWTON, CHAMBERS, & CO., LIMITED

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

SLIDE VALVES,
WITH RACK & PINION
OR
Internal or External
SCREWS, of all Sizes.

GASHOLDERS,
AND
Gasholder Tanks.



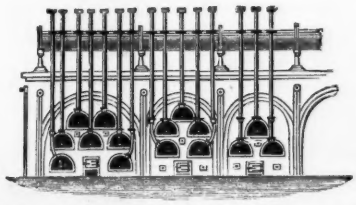
CAST-IRON RETORTS,

RETORT-BED FITTINGS,

And Retort-House Appliances

of every description.

Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

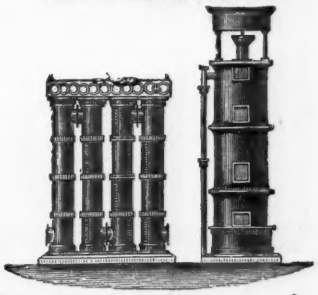


WROUGHT AND CAST IRON

CONDENSERS,

SCRUBBERS, & WASHERS,

TAR AND LIQUOR PUMPS, &c.



PATENT

CENTRE VALVES

for working Purifiers.

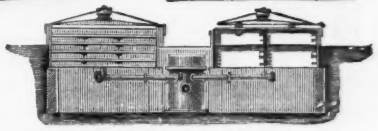
Also Bye-Pass & Stop Valves

PURIFIERS with Planed Joints,

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS,

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

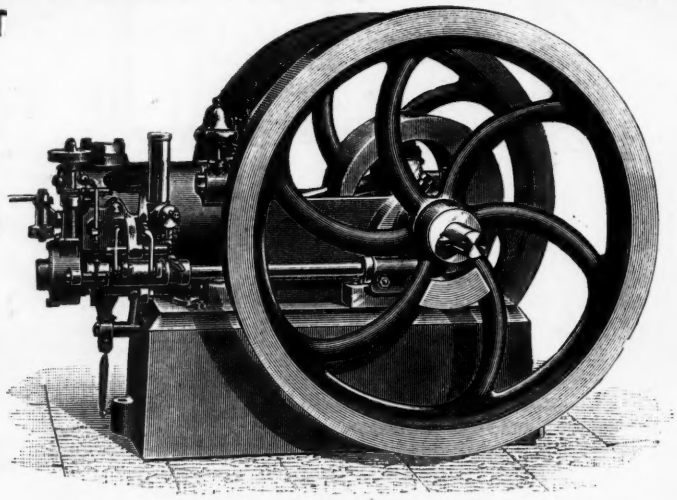
Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

CROSSLEY'S "OTTO" GAS-ENGINE.

CRYSTAL PALACE EXHIBITION, "DIPLOMA OF HONOUR"—Highest Award to Gas-Engines.

CROSSLEY'S PATENT OIL-ENGINES, PATENT STARTERS PATENT TUBES FOR IGNITION, PATENT PENDULUM GOVERNORS, PATENT SAFETY HANDLES, PATENT TIMERS, PATENT ANTI-FLUCTUATING GAS-BAGS.



PATENT CATARACT GOVERNORS, CHANGE SPEED GOVERNORS.

Every Engine thoroughly tested before being sent out

ALL PARTS MADE STRICTLY TO GAUGE.

GREAT REDUCTION IN PRICES.

OVER 800 ENGINES ALWAYS IN HAND.

CROSSLEY'S NEW HIGH-SPEED ENGINE FOR DIRECT ELECTRIC LIGHTING.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER.

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND.

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

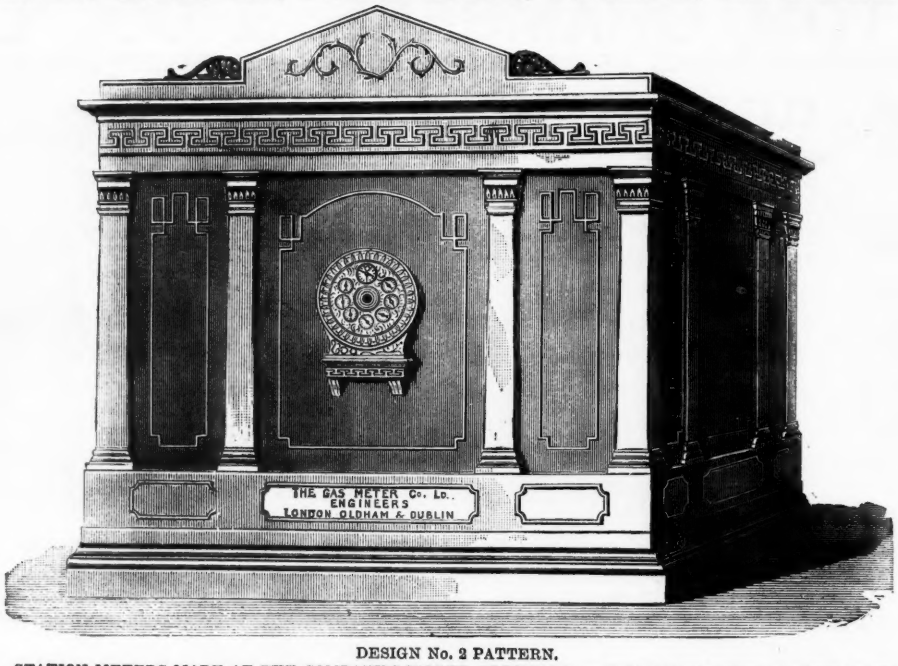
GLAZED BRICKS AND PORCELAIN BATHS.

THE GAS-METER COMPANY, LIMITED.

MANUFACTURERS OF

WET AND DRY GAS-METERS, STATION METERS, GOVERNORS, GAS APPARATUS, ETC.

SQUARE STATION METERS WITH PLANED JOINTS.



STATION METERS IN CYLINDRICAL CASES.

DESIGN No. 2 PATTERN.

STATION METERS MADE AT THE COMPANY'S WORKS, OLDHAM, LATE WEST & GREGSON, Established 1830.

For Prices and Particulars apply to

R. L. ANDREWS, General Manager.

Works: 238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

Telegraphic Address: "METER."

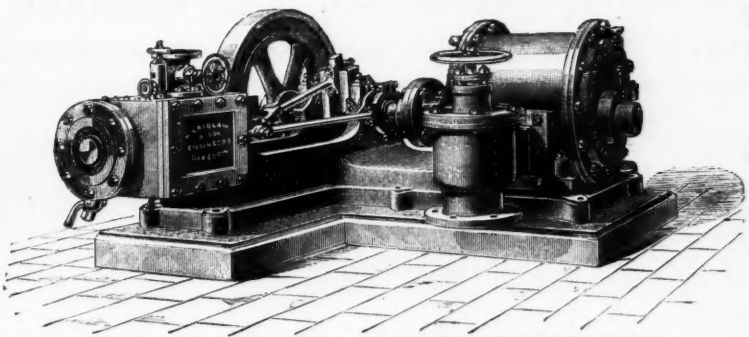
[See Advertisement on back of Wrapper.

R. LAIDLAW & SON,

GAS AND WATER ENGINEERS.

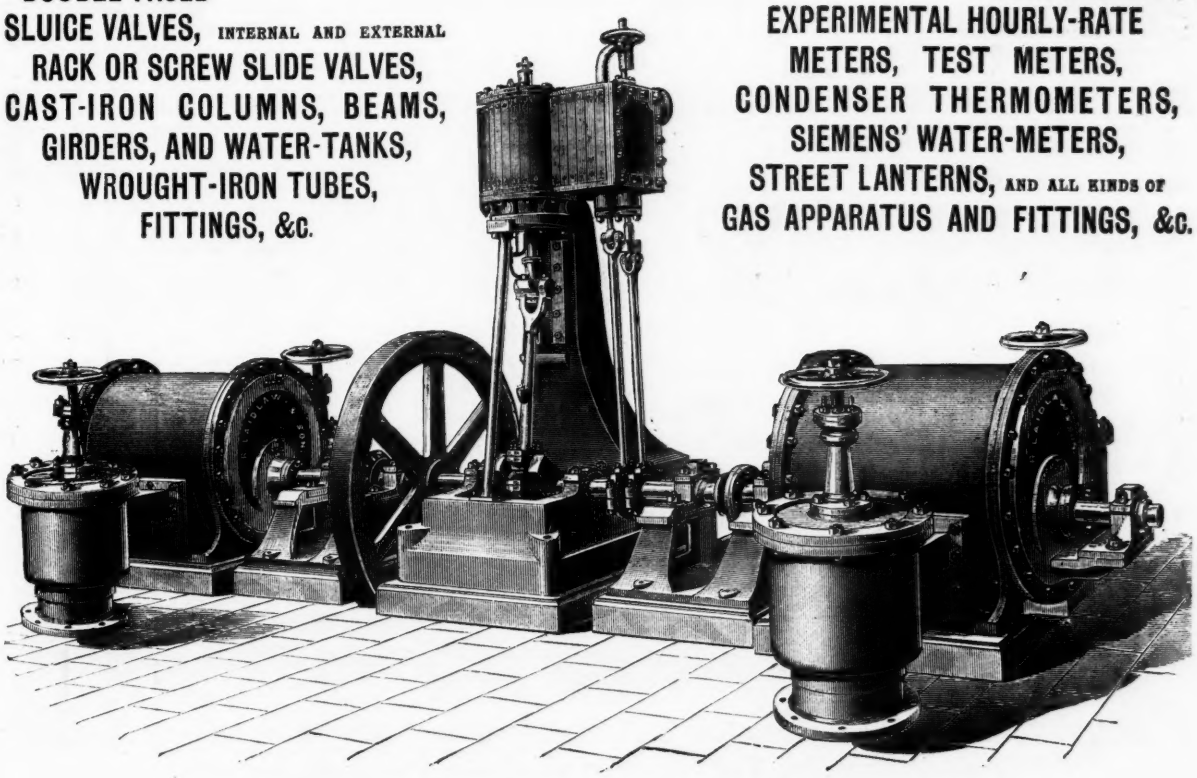
Manufacturers of **GAS APPARATUS** of every Description.

Makers in Glasgow of
CAST-IRON PIPES, ALL SIZES,
LAMP PILLARS,
STEAM-ENGINES AND BOILERS,
PUMPING-ENGINES For Water-Works.
BEALE'S GAS EXHAUSTERS,
DOUBLE-FACED SLUICE VALVES, INTERNAL AND EXTERNAL
RACK OR SCREW SLIDE VALVES,
CAST-IRON COLUMNS, BEAMS, GIRDERS, AND WATER-TANKS,
WROUGHT-IRON TUBES,
FITTINGS, &c.



PUMPING GAS EXHAUSTER AND ENGINE COMBINED. All Sizes.

Makers in Edinburgh of
WET AND DRY GAS-METERS, IMPROVED
STATION GOVERNORS,
PRESSURE REGISTERS (To Indicate Now Time),
PRESSURE GAUGES,
TEST HOLDERS,
EXPERIMENTAL HOURLY-RATE METERS, TEST METERS,
CONDENSER THERMOMETERS,
SIEMENS' WATER-METERS,
STREET LANTERNS, AND ALL KINDS OF
GAS APPARATUS AND FITTINGS, &c.



BEALE'S GAS EXHAUSTERS AND ENGINE COMBINED. All Sizes.

Prices, with full Particulars, will be given on application.

Two Gold Medals, One Silver Medal, One Bronze Medal, and Two Honourable Mentions,
INTERNATIONAL EXHIBITION, EDINBURGH 1886.

ALLIANCE FOUNDRY, **GLASGOW.** | SIMON SQUARE WORKS, **EDINBURGH.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**

GASHOLDERS

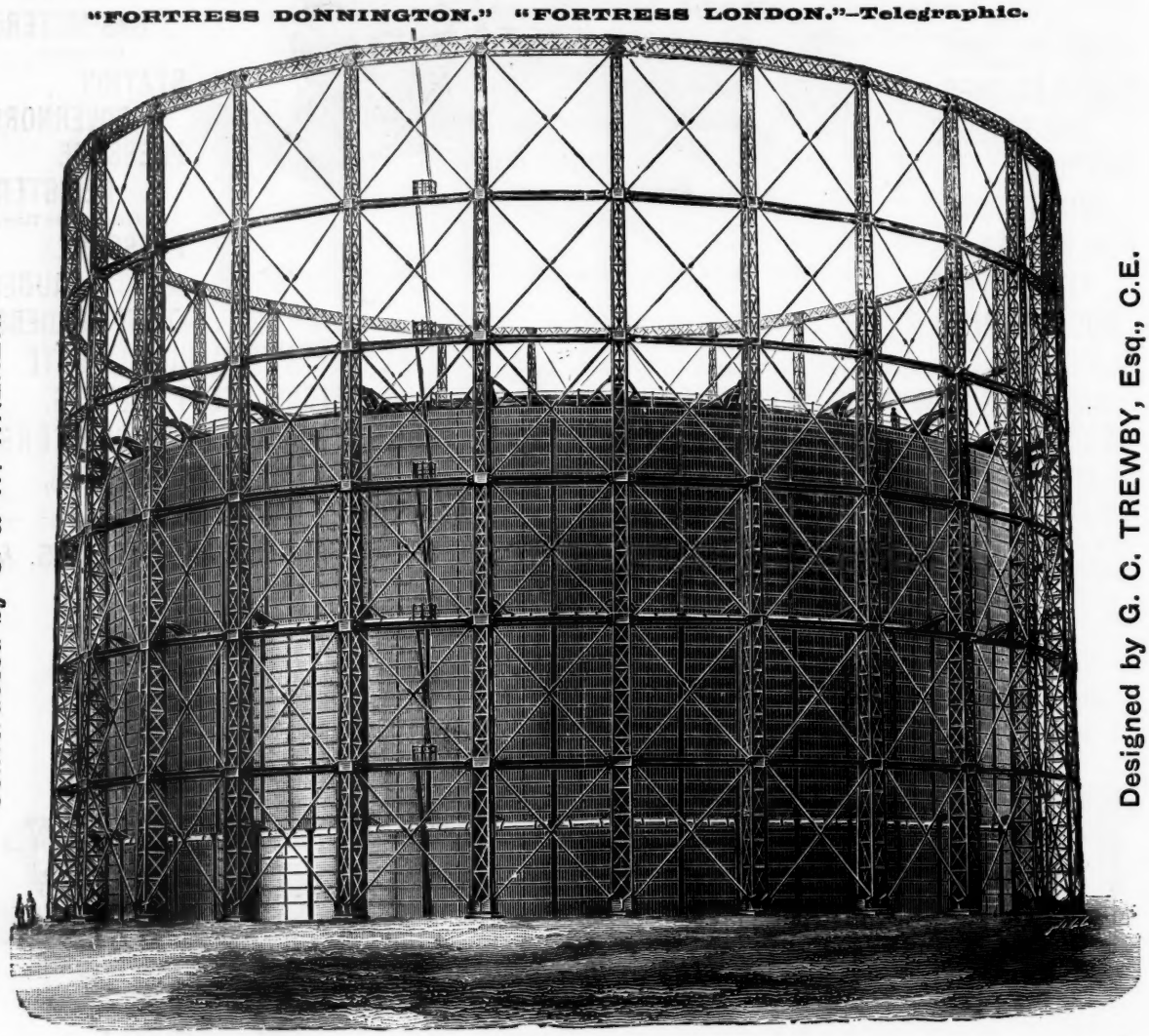
C. & W. WALKER,

MIDLAND IRON-WORKS, DONNINGTON, NEAR NEWPORT, SHROPSHIRE;

10, Finsbury Square, London.

"FORTRESS DONNINGTON." "FORTRESS LONDON."—Telegraphic.

Constructed by C. & W. WALKER.



Designed by G. C. TREWBY, Esq., C.E.

Four-Lift Gasholder, nearly 200 feet high, and 8 million Cubic Feet capacity, recently erected by us for The Gaslight and Coke Company, London.

PURIFYING MACHINES.

PURIFIERS. SULPHATE PLANT.

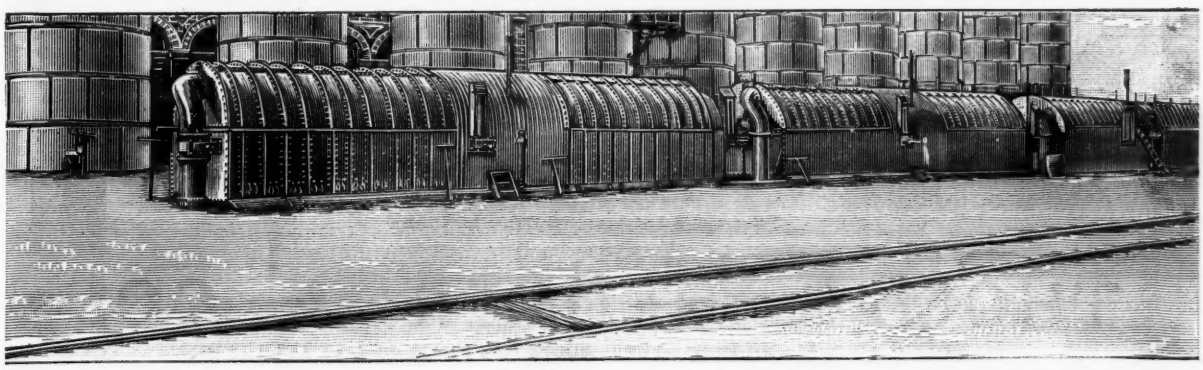
Weck's Centre-Valve.

KIRKHAM, HULETT, & CHANDLER, Ld.,

Patentees of the

PATENT "STANDARD" WASHER-SCRUBBER.

☛ **465 of these Machines (capable of dealing with 440,807,000 cubic feet of Gas daily) have been supplied, which fact is given as evidence of this apparatus being the Most Efficient of any in the Market for the extraction of Ammonia, Carbonic Acid, and Sulphuretted Hydrogen from Coal Gas.**



View of SIX PATENT "STANDARD" WASHER-SCRUBBERS, erected at the Beckton Station of The Gaslight and Coke Company (the Engines driving same being under Galvanized Iron Covers). This Company has **27** of these Machines in use; and they are also in operation at a great number of Gas and other Works in this Country and abroad.

Address : 3 & 4, Palace Chambers, Bridge St., Westminster, S.W.

THE "METEOR" HIGH-POWER GAS-LAMP.

CLASS B.

The Electric Light's greatest Rival. Has been awarded 8 Gold and Silver Medals.

For inside, and outdoor Lighting.

THE "METEOR" LAMP IS

The cheapest
The simplest
The most economic
The most durable
The most brilliant
The best ventilating
The most easily cleaned

} **Lamp in Existence.**

The best and most suitable Lamp for hiring and hire-purchase. Being made entirely of fine Cast-Iron, the "Meteor" is practically indestructible. Greatly reduced prices. Liberal terms. Write for new descriptive reduced price list.

N.B.—Accessories are now offered at greatly reduced prices.

W. J. MOORE,

Sole Manufacturer's Representative,

83, UPPER THAMES STREET, LONDON, E.C.

THE SILICA FIRE-BRICK COMPANY,

OUGHTYBRIDGE, NEAR SHEFFIELD.

Established 1858. The First Manufactory of Silica and Dinas Fire-Bricks erected in England.

MANUFACTURERS OF

SILICA FIRE-BRICKS,

(TRADE MARK "SILICA")

Specially adapted for Siemens-Martin Gas-Furnaces; also for Gas, Copper, Iron, Steel, and other Furnaces where intense heat is required.

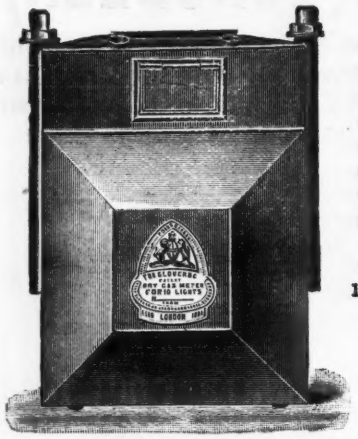
BESSEMER GANNISTER, STEEL-FURNACE GANNISTER, COPPER-FURNACE GANNISTER, IRONFOUNDERS' CUPOLA SAND, FINE-SETTING SILICA CEMENT, STEEL MOULDERS' COMPOSITION.

Our Silica Bricks have gained a high reputation for Unsurpassed Quality in most of the leading Firms in England and on the Continent. Export orders delivered Liverpool, Hull, Grimsby, or the Tyne.

[ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

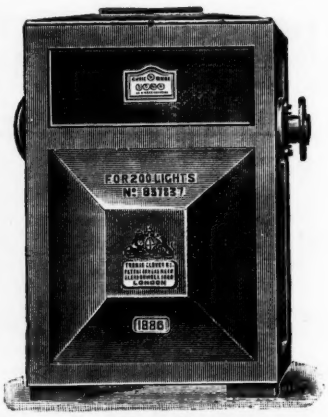
LONDON, 1851. NEW YORK, 1853. PARIS, 1855. LONDON, 1862. DUBLIN, 1865. PARIS, 1867.

THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;
The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.



1st.—Are a remedy for all the defects of Wet Meters.
2nd.—Are suitable for all Climates, whether hot or cold.
3rd.—Incur no loss of Gas by Evaporation.
4th.—Cannot become fixed by Frost, however severe.
5th.—Are the most accurate and unvarying measurers of Gas.
6th.—Prevent jumping or unexpected extinction of the Lights.
7th.—May be fixed either above or below the level of the Lights.
8th.—Cannot be tampered with without visibly damaging the outer case.
9th.—Will last much longer than Wet Meters.
10th.—Will not cost more than one-half for repair that Wet or Water Meters do.

Are upheld for five years without charge.



Telegraphic Address: "GOTHIC LONDON."
Telephone No. 6725.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

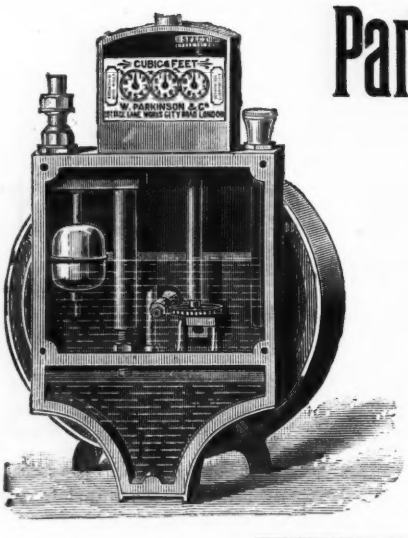
214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

BRISTOL:	BIRMINGHAM:	LEEDS:	MANCHESTER:
62, VICTORIA STREET.	3, BRIDGE ROW, DERITEND.	BOAR LANE CHAMBERS, 4, BASINGHALL STREET.	37, BLACKFRIARS STREET.
Telegraphic Address: "GOTHIC."	*Telegraphic Address*: "GOTHIC."	*Telegraphic Address*: "GOTHIC."	*Telegraphic Address*: "GOTHIC."

W. PARKINSON & CO.

ESTABLISHED 1816.

MANUFACTURERS OF WET METERS.



Parkinson's Cast-Iron Case Meter.

Works with very little friction.
Will stand very high pressures.
Cannot possibly be shut off by sudden increase of pressure; the float being affected by outlet gas only.
Allows for loss of water by evaporation without materially affecting the registration or shutting off the gas.
Unexcelled for Simplicity of Construction, Excellence of Workmanship, and Accuracy of Registration.

COMPENSATING METERS,

In Tinned or Cast-Iron Cases.

COTTAGE LANE WORKS, CITY ROAD,	BELL BARN ROAD WORKS,	10, MAWSON'S CHAMBERS, DEANSGATE,
LONDON.	**BIRMINGHAM.**	**MANCHESTER.**
Telegraphic Address: "INDEX."	Telegraphic Address: "GAS-METERS."	Telegraphic Address: "PRECISION."

CONTENTS.

EDITORIAL NOTES:—
GAS, LIGHTING, &c.— PAGE
The Chartered Report and Accounts . . . 205
The North British Meeting . . . 206
The Miners' Strike . . . 206
Bonus Day at the Old Kent Road . . . 206
The Libel Actions of J. H. Wilson . . . 207
WATER AND SANITARY AFFAIRS—
The London County Council and their Representation on the Thames and Lea Conservancies . . . 208
The Projected Purchase of the Portsmouth Water-Works by the Corporation 208
ESSAYS, COMMENTARIES, AND REVIEWS:—
Gas and Water Companies in the Stock Market . . . 209
Electric Lighting Memoranda . . . 209
The Meeting of the North British Association of Gas Managers . . . 210
The Alkali Act Inspector on Aërial Sanitation . . . 211
NOTES:—
Solid Ammonia Washing-Powder . . . 212
Producer Gas-Engines in France . . . 212
The Manufacture of Arc Lamp Carbons . . . 212
An American Test of a Producer Gas-Engine . . . 212
COMMUNICATED ARTICLES:—
Four Years' "Progress" of Water Gas. By R. S. Moss . . . 212
The World's Fair at Chicago. By Our American Correspondent . . . 213
TECHNICAL RECORD:—
North British Association of Gas Managers—Annual Meeting at Dundee—
General Report . . . 214
Inaugural Address of Mr. Douglas Hall . . . 215
PARLIAMENTARY INTELLIGENCE:—
House of Lords—Progress of Bills . . . 219
House of Commons—
London County Council (General Powers) Bill . . . 219
Progress of Bills . . . 220
MISCELLANEOUS:—
Brentford Gas Company—The Half-Yearly Report and Accounts . . . 220
Meeting of the Devonport Gas Company . . . 220
Gaslight and Coke Company—The Half-Yearly Report and Accounts . . . 221
The Crisis in the Coal Trade . . . 223
The South Metropolitan Gas Company and their Workmen—Annual Meeting of Directors, Officers, and Men . . . 224
Electric Lighting in Birmingham—Corporation v. Company Control . . . 224
The Inspection of Gas Liquor and other Works under the Alkali Act—The Sub-Inspectors' Reports . . . 225
A New Pumping-Engine at the Widnes Water-Works . . . 227
Metropolis Water Supply—The Quality of the Water in June . . . 228
Notes from Scotland . . . 229
Current Sales of Gas Products . . . 230
Coal Trade Reports . . . 230
Gas and Water Companies' Stock and Share List . . . 231
PARAGRAPHS.—Death of Mr. W. P. Haymen, J.P., of Rochester, 207—The Oil Gas Enrichment Company, Limited, 207—Proposed Testimonial to Mr. William Livesey, 207—The Official Inspectorship of Gas-Meters for Manchester, 208—North of Ireland Association of Gas Managers, 208—Mr. T. Trewhitt a Justice of the Peace, 210—Death of Sir T. Martineau, 210—A Vacancy on the Board of the West Kent Gas Company, 211—Visit of the Association of Municipal and County Engineers to the Globe Tube-Works, Wednesbury, 211—Cleveland Water Company, 220—New Water-Works for Denby, 220—The Proposed Amalgamation of Water-Gas Undertakings, 220—Electric Lighting and Sewerage Works for Wolverhampton, 220—Water and Drainage Works for Millbrook, 221—The Birmingham Corporation Water Scheme, 221—The Purification of the Thames, 221—Gas Coal Contracts, 223—The Work of the London County Council, 225—A Gadd and Mason Columnless Gasholder for Chester, 228—The Huddersfield Electric Lighting Scheme, 228—Slandering a Gas Company, 228—Redemption of Bonds of the City of St. Petersburg New Water-Works Company, Limited, 230—Sales of Shares, 230—Electric Light Companies' Dividends, 231—Typhoid Fever on the South Coast, 231—Unlawfully Taking Water, 231.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

THE
JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 1, 1893.

The Chartered Report and Accounts.

THE report of the Directors of The Gaslight and Coke Company, which, with the accounts for the past half-year's working of the undertaking, will be found in another column, will be perused with particular interest, as it is the first official pronouncement that has emanated from the Horseferry Road since the change of management. By this time next year it will become evident what is the significance of this change in the control of the Company which, by reason of the magnitude of its operations, is popularly accepted as the mirror of the British gas industry. It is too soon to look for anything of the kind in the present report and accounts; yet there is a difference in the drafting of the former which appears, to a critical eye, to reveal the precise hand of the late Accountant. After stating the amount of the profit balance—£358,878, which is sufficient to pay the statutory 12 per cent. dividend and leave £21,082 to be carried forward—the report goes on to admit a decrease in the quantity of gas sold of 2·8 per cent. after correction for Leap Year. This is, of course, a very proper correction, which, having originally been regarded only by the Chancellor of the Exchequer, has now come to be made by Chairmen of Railway Companies, and at last reaches the Horseferry Road. A day's business of The Gaslight and Coke Company is quite large enough to affect, by its inclusion or exclusion, the accounts of a half year; but we believe we are justified in drawing attention to the correction on this occasion as being the first instance of the kind on record. The fact of the net reduction of consumption being admitted, the next thing is to explain it. This the report is able to do very rationally. With the exception of the month of January, which was very cold and "seasonable," the past half year was characterized meteorologically by weather most unfavourable to the consumption of gas. Both the average of temperature and the amount of recorded sunshine were phenomenally high; and it will probably be found, when the accounts of other Gas Companies appear in due course, that The Gaslight and Coke district was not singular in registering a diminished demand for the light and warmth of gas. The connection between the temperature of a season and the gas consumption has long been established; but we do not recall any previous instance of the duration of sunlight being so prominently brought forward as it is in the report under notice in the same connection.

After a passing reference to the residuals market, the report grapples in very strenuous fashion with the subject of gas testing. Forfeitures amounting in all to £14 have been inflicted upon the Company during the half year, "in respect of deficiencies in the illuminating "power and purity of the Company's gas, as shown by "the testing officials of the Local Authorities," which the report rightly treats as a most serious matter. It is conceivable that if a newspaper writer were to get hold of this point, he would be moved to jeer at the amount of the penalties, and, with that liberty of "assertion without "knowledge" which a modern censor of the Press has stated to be one of its shortcomings, he might argue that such a wealthy corporation would not feel the loss of a hundredfold this sum. This is so far true as that Gas Companies, like other traders, stand to lose heavily by the vicissitudes of commerce and industry; and the Directors of The Gaslight and Coke Company know very well what it is to see the Company's stocks of coals and residuals fluctuate in value to the extent of many thousands of pounds. The maintenance of the illuminating power and purity of gas is, however, a point of honour with a gas company, as well as being a statutory obligation; and it is a matter to which the responsible officials pay heed as though the existence of the undertaking depended upon satisfying the provisions of the law in this respect, which is, in a sense, the truth. Recent incidents have illustrated the onerous character of gas-testing regulations, as applied to the London Gas Companies; and it is not to be wondered at that the latest photometrical vagary—the now notorious "candle trick"—has so stirred The Gaslight and Coke Directors as to have caused them to take the unusual course of reporting it to the proprietors. One can well imagine the latter impatiently asking why the London County Council cannot leave the Gas Companies alone. The truth of the matter is that the clever gentlemen who devote so much of their lives to photometrical work, in the supposed interest of the public, take an altogether different view of the statutory testing of gas from that of practical gas makers, and that the County Council have a marked tendency to be "faddy" in such small matters as the little men among this curious body deem themselves able to understand. In the enactment that London shall be supplied with 16-candle gas, there is a point that can be grasped by the meanest capacity; and the point is fined down and sharpened with an assiduity that, as gas makers contend, is wholly misplaced. Unhappily, the very measure that was taken by that paternal Government Department, the Board of Trade, to bring about a more satisfactory condition of affairs in regard to gas testing in London, has so far resulted in something very like a deadlock; and nobody knows how a situation which is fast becoming intolerable is to be changed.

The report states that the coal required for the ensuing year has been contracted for at rates which show a satisfactory reduction as compared with the contracts of recent years; so that, if nothing untoward happens to prevent it, "the Directors will be able to announce a reduction in "the price of gas as from the 1st of January next." This is rather a far cry; but the promise is probably held out

as a means of pacifying the consumers who have been grumbling of late at the dearness of the Company's gas. The report concludes with a reference to the retirement of Mr. J. Orwell Phillips and the appointment of Mr. John William Field in his stead. The meeting will be asked to fix the amount of the salary to be paid to the new Secretary and General Manager.

The accounts show that the capital outlay upon the undertaking has risen to £11,348,604; while the volume of business done, as stated in the report, has not increased proportionately. This means no more than that the Company will be in a good position for doing a bigger trade when it comes, in the ordinary course. It also means, unfortunately, that for the time being the capital burden has attained a higher ratio per ton of coal carbonized than is altogether desirable. Gas-rental stands at £1,411,972, as compared with £1,474,401 for the corresponding half of last year, when ordinary gas was at the same price in the northern portion of the district, and cannel gas was on sale. The abolition in the present accounts of the cannel gas department renders exact comparisons impossible under certain heads. Speaking of cannel gas, however, we are curious to learn why the proportion of cannel coal still stands so high in the carbonizing accounts, although the old excuse for extravagance in this respect no longer exists. Last half year, 5·5 per cent. of cannel (including oil) was carbonized; whereas for the year 1891 only 3·20 per cent. of cannel was required, although 3 per cent. of the gas sold was classed as "cannel." Is this due to the County Council? To revert, however, to the revenue account. It is regrettable that the return from residuals, quite bad enough before, should have fallen still further; the decrease being very nearly £20,000. Altogether, the gross revenue fell from £1,893,655 to £1,812,277, or a decrease of £81,378. Like many another concern, however, the Company have found a source of revenue in economical expenditure. Coal cost only £646,829, as compared with £746,342; and carbonizing wages dropped £5273. The suggestion that the oil and water gas production should be distinguished from the coal gas manufacture has not been carried out; and the former is on a scale quite large enough to upset any calculations referring the carbonizing expenditure to the latter alone. The cost of purification has fallen considerably—from £36,178 to £29,789; while repairs and renewals have swollen from £149,804 to £154,719. Of the other items of account, the most noteworthy is not, as the report would have the proprietors think, the parliamentary charges; although these are heavy enough. We should place in this "bad pre-eminence" the increase of rates and taxes from £71,654 to £86,475, which to unofficial eyes looks like a memento of the bad management of the last rating appeals. Altogether, the profit balance has risen from £539,413 to £546,344, thanks to the cheaper coal. Credit is due to the Directors for the degree in which they have shown their ability to take advantage of this favourable turn of the coal market—if it does not mean that they have been purchasing an inferior quality of coal, which circumstance would explain the heavy consumption of enrichers.

The North British Meeting.

The meeting of the North British Association of Gas Managers at Dundee on Thursday last was very well attended; and the proceedings were creditable to the organization. Mr. T. Douglas Hall, of Montrose, the President, took the chair, and delivered the address which will be found in another column. The utility of the Association, as an aid to gas managers in the conduct of their ordinary duties, was well exemplified by the report of the Committee, which propounded a drastic scheme of coal testing, for the confusion of tricky coalowners and the guidance of carbonizers. The chief technical work of the meeting was the advertisement—using the term in the old-fashioned sense—of the Young and Bell oil-gas process, the nature of which is sufficiently known to our readers. The papers of Messrs. Young and Bell were well debated—so well, indeed, as to prevent the meeting from hearing and discussing all the other papers entered upon the programme. In the course of the day, time had to be found for an inspection of the gas-works and the municipal electric light works; and the members dined together in the evening. On Friday there was a very enjoyable excursion to the Dundee water reservoir at Monikie. The President for the ensuing year is Mr. J. M'Gilchrist, of Dumbarton; and the Association will meet in Glasgow. It should be mentioned that Mr. M'Gilchrist, in his capacity of Convener of the Murdoch Memorial Fund Committee, made a statement to the meeting showing that £300 remains to the credit of the Fund after defraying all expenses in connection with the function of last year. He hopes by the next meeting to see this balance increased to £500, in order that a bursary may be provided to keep the name and memory of Murdoch green in the land of his birth.

The Miners' Strike.

The threatened strike of the miners belonging to the National Federation throughout the Lancashire, Staffordshire, Warwickshire, and Worcestershire coal districts commenced on Saturday; and before one month is over—perchance sooner—it will be seen whether the employers, whose view of the situation we have published elsewhere, or the Executive of the Federation have taken the right view of the situation. The employers rely upon undeniable facts connecting the selling price of coal with the wages to be paid for mining it; while the spokesmen of the Federation put all such considerations aside, and claim that the rate of wages hitherto paid in the affected districts shall continue to be paid, on the ground that this is the lowest rate at which a miner can maintain a decent existence. This contention at once removes the dispute between the employers and the men into the region of "principle," which is the favourite fighting-ground of Union managers. The coalowners appear to have cherished the impression that the price to be paid for getting coal should be regulated by a sliding scale. This is admitted in some districts, where wages go up and down as a matter of course, according to the state of trade. The Federation scout this idea, and declare that the coalowners have it in their power to make trade good or bad as they will. The recent fall in the price of coal is charged to the competition of the coalowners of different districts; and those in the Federation region are now told that since they dropped their quotations to please themselves, the men will please themselves by declining to receive a correspondingly reduced wage. Here we have a "principle" calculated to serve as a rallying-cry for all the socialistic Trades Union leaders in the kingdom; and it will be interesting to watch its developments. The merchants are holding back for increased prices; and this temporary advance is used by Mr. Pickard, M.P., as an argument against the masters' action. Unfortunately for him, however, it also strengthens the sliding-scale districts, where every man who remains at work will benefit at the expense of those on strike. The cause of the Federation leaders is warmly espoused by the *Daily Chronicle*, which argues with more heat than force against "the assumption "that to prices must be left the regulating of wages," and falls back upon the Pope whose encyclical on the labour question is cited for the sake of its declaration that every worker—and hence by inference every coal miner—is entitled to receive "what will suffice to keep a man and "his family in decent and frugal comfort." But who is to be the judge of what this means? and why should miners, of all men, be excepted from the operation of the natural law, which does not depend upon the authority of Pope or Parliament, that "the worth of anything is "just as much as it will bring"? One miner's idea of living in frugal comfort may include the keep of a few prize dogs, and the means of "playing" two days a week to the solace of unlimited beer. Another may be content with a little oatmeal, and pass his blameless evenings in attending University Extension lectures. What is the connection between these wants and the means whereby they are to be gratified? There is none in this working world, although Socialists bemuse themselves with talk about the time when everybody is to have and do what he likes, and somebody else is to pay for all, until they come to believe that economic laws are even now abolished. We are constrained to think that, notwithstanding the rhapsodies of such prophets as Mann, Tillett, Aveling, and their like, the miners who struck last week will be stricken before the much-abused agency of Economic Law has done with them. The *Daily Chronicle* admits that "coalowners and agents and "merchants are merely the intermediaries in the matter." This is the truth; and it should be held sufficient to

absolve these intermediaries from blame, until it can be proved that they have deliberately elected to sell their coal at unremunerative prices.

Bonus Day at the Old Kent Road.

It is pleasant to turn from the perusal of reports of industrial disputes to such reading as that furnished by the proceedings on "Bonus Day" at the South Metropolitan Gas-Works. Some of the daily newspapers were struck, as might well be the case, with this manifestation of the truth that it is possible—not exactly to unite the interests of employers and employed, for this has been done by the fundamental law of industrial production, but to exhibit this essential union in a way that the simplest workman cannot misunderstand. This is the meaning of these annual reunions at the Old Kent Road; and the lesson should be proclaimed far and wide, for the instruction of all who are free to learn it. It is unnecessary to claim universal applicability for the South Metropolitan plan of profit-sharing, which is admittedly conditioned by circumstances. It is enough for those who devised and have administered it—through good and through evil report, in face of cold indifference and despite the reproach of singularity—that it answers. No wonder the agitators and manufacturers of labour troubles hate the name of the South Metropolitan Gas Company and of Mr. George Livesey. There is no living to be got from the South Metropolitan workers by such monstrous excrescences of the industrial system of the day—no seat in Parliament, or on the County Council to be reached by climbing upon their shoulders. It is impossible for a "popular" newspaper to make exciting "copy" out of the quiet co-operation in profit-earning that has succeeded to the great disaffection that was sown among the South London gas stokers by the blunderers of '89, and the baffled mischief-makers have learnt to leave the successors of their dupes alone. It is only when "Bonus Day" comes round that the outer world gets a chance of seeing how it fares now with Mr. Livesey and his men; and the picture, as we are able to give it in another column, is bright enough to impress the most confirmed pessimist with the conviction that if more people would only deal directly, according to their lights and means, with the nearest evils of their environment, the working world would be a better place of sojourn than it is, even though the socialistic millennium lingers in coming.

The Libel Actions of J. H. Wilson.

The cause and the methods of the New Trades Unionism, as represented in the person of Mr. J. H. Wilson, M.P., the General Secretary of the Amalgamated Seamen and Firemen's Union, received a "heavy blow and great discouragement" by the failure of this now notorious personage to secure a verdict in his libel actions against various newspapers, which were disposed of at the recent Guildford Assizes. For some reason unknown to us, the *Evening News and Post*, one of the London evening newspapers—a class of publications which usually cultivates "popular" views of questions of the day—has all along consistently refused to believe in J. H. Wilson, and has published many bitter reflections upon his conduct as official head of the Seamen and Firemen's Union. The Union is admittedly in a bad way, and most of the money contributed by the confiding members has gone in supporting Wilson and the other officials, or has been squandered in ways and for purposes not contemplated by the rules. The *Evening News* said as much, over and over again, and said it very offensively; whereupon Mr. Wilson thought fit to take proceedings against the proprietors for publishing what he alleged to be "false and malicious" libels upon him in this connection, and he also claimed £7000 damages. It was perhaps the only thing he could do to rehabilitate the Union and at the same time restore his own reputation as an administrator; but it is hardly conceivable that a man in such a position, knowing how matters really stood, should have ventured into Court. As it was, the unfortunate agitator—for it is impossible to refrain from pitying the man—was simply turned inside out by the Counsel for the defendants; and, after having confessed to the commission of all sorts of irregularities in his office, he broke down in the box, and the case was settled without calling witnesses for the defence. The jury found that whatever the *Evening News and Post* had said of Wilson was fair and reasonable comment upon a matter of public interest; and with this verdict against him the once-considerable agitator stands before his dupes a powerless, discredited blunderer. The only excuse for Wilson that has come under our notice is supplied by the *Daily News*, which, speaking of the admitted errors and extravagances of Wilson and his fellows, remarks that "the business of these men, wisely "or unwisely on the part of those who give them their orders, is agitation." And the argument goes on to insinuate that the cause of agitation, right or wrong, is so sacred, that such trifles as the misapplication of funds to objects undreamt of by the subscribers, and contrary to express rules, must not be weighed in the balance. Then comes the imputation that "it is fortunate for the other "side that they rarely come under the same obligation "of justifying the expenditure of every farthing before "the world. The money that is subscribed for putting "down strikes is contributed in faith, and spent in "confidence; and no man feels entitled to ask how it has "been employed. It is only the strike leaders who "are required to be like Cæsar's wife." If this wretched sophistry is not a direct apology for the malversation of public money and the defiance of rules by those who are in effect trustees for people who are absent and unable to look after their own money, it would be difficult to say what else can be the writer's meaning. We opine that when employers set about spending money in putting down a strike they are dealing with what is their own, and can do as they please with it, subject to the laws of the land. If the Seamen and Firemen's Union had no rules, but was merely started to endow a certain person and his associates with money to spend at their discretion, there would be nothing to be said. Can it be believed, however, that if hard-working members of the Union had had this prospect set before them, they would have confided their weekly sixpences to Wilson? Instead of excusing Wilson, it should be the care of true friends of the labouring man, whether he works on the sea or on land, to expose such persons in their true colours as the greatest foes to the cause they profess. While the Union was supposed to be in funds, this man and his satellites went swaggering up and down the country intimidating here, rioting there, stirring up strife in every port, and posing always as a Heaven-sent saviour of the virtuous working man from the capitalist ogre. Now it is to be hoped that one more agitator has received his *quietus*. We confess we are sorry for the Seamen and Firemen, whose hopes of being able to present a united front to those whom they may consider their natural enemies are disappointed by the unworthiness of their trusted agent. It is stated that Wilson's personal character was not in question in the recent trials, inasmuch as he was not accused of having fraudulently applied the moneys of the Union to his own benefit. This is doubtless technically correct; but the Guildford jury nevertheless, by their verdict, branded this Union official as one of the greatest failures in that position to be found in the history of trade organizations.

Death of Mr. W. P. Haymen, J.P., of Rochester.—The death, at the advanced age of 89, of Mr. W. P. Haymen, of Rochester, has lately been announced. The deceased was the senior Justice of the Peace, and also a Director of the Rochester Gas Company.

The Oil Gas Enrichment Company, Limited.—By an announcement which appears in another part of the Journal, our readers will see that a Company has been formed, with a capital of £30,000, in £1 shares, to acquire and work the patents of Messrs. Young and Bell for their process for the manufacture of oil gas. Among the Directors are Mr. J. Milne (Messrs. J. Milne and Son, Limited, of Edinburgh), Mr. W. Young, and Mr. G. T. Beilby.

Proposed Testimonial to Mr. William Livesey.—As will be seen from our advertisement columns, a movement has been started to present a well-merited testimonial, which will probably take the form of an annuity, to Mr. William Livesey, Secretary of the Gas Companies' Association. Mr. Livesey has spent the greater part of a long life in the service of gas interests—largely in ways for which pecuniary recompense was impossible. The proposal originated, we believe, with Mr. Howard C. Ward, Deputy-Governor of The Gaslight and Coke Company, who also acted for many years as Chairman of the Gas Companies' Association, and so became intimately acquainted with Mr. Livesey's work. Mr. Ward is Chairman of the Committee; and Mr. Corbet Woodall the Secretary and Treasurer. The latter will be glad to receive contributions, and to furnish further information if required. We commend the effort to the cordial co-operation of our readers.

WATER AND SANITARY AFFAIRS.

In a debate continued at some length, but closing without a division, the House of Commons resolved last Tuesday to disagree with the Lords' amendments on the General Powers Bill of the London County Council. Those amendments had the effect of removing from the Bill certain clauses which had been passed by the Commons, giving the County Council representation on the Thames Conservancy Board, and two extra members on the Lea Conservancy; power being also granted to the Council to expend £10,000 on capital account to defray the cost of investigations and negotiations "on "any subject" they might see fit to entertain "in the "public interest." During the debate on Tuesday, the Commons, at the instance of Sir John Lubbock, yielded so far as to allow that this expenditure should be limited to £1000, unless with the consent of the Local Government Board. Of course, it was well understood that the outlay of this money had reference to the Metropolitan Water Supply. It was to furnish, in a degree, the sinews of war in the attack on the Water Companies. So also the Conservancy scheme was simply a tactical movement for strengthening the position of the Council in the struggle to get the water supply into their possession. No proof was given in the Commons that the Conservancy Boards had failed to perform their duties, or that their action was in any way objectionable. All idea of hostility to the Conservators was disavowed. But antagonism to the Water Companies was in no way repudiated. The arguments were particularly directed to the control of the Thames. Allowing that the work of the Conservators was well done, it was urged that the Council could help them to do it still better. Nothing was said about locks and weirs, and navigation. But by the advocates of the Bill as originally framed, it was argued, or implied, that as the Council had purified the river at Barking Creek and Crossness, so they could improve the stream above the intakes. The two cases obviously have nothing in common, although if the Council were really capable of doing more than is being done to keep the upper stream free from pollution, their help might be welcome. This, however, is not the point; and everybody knows it. France has been credited with aiming a blow at England through Siam. So in like manner the County Council seek to damage the Water Companies through the medium of the Conservancy Boards. The merits of the case are doubtless well understood in the House of Lords, and all this fine talk about the due control of the river really means getting the upper hand of the Water Companies. There is too much reason to fear that the County Council will gain their end, though on the side of the Government there has been a suggestion for a general inquiry into the constitution of the two Conservancy Boards, so that the claims of other authorities besides the County Council might be duly considered. If the Council succeed in getting four representatives on the Thames Conservancy Board and three on the Lea, the mask will soon be thrown aside, and every effort will be made by the new representatives to reduce the volume of water taken from the streams. Not that the rivers will be any the better for the interference; but the Water Companies will be harassed—which is the thing to be done. It is a piteous spectacle to see the House of Commons converted into a machine to promote the designs of the County Council. Because the House of Lords refuses to be thus subservient, it is threatened with extinction. The threat is absurd, but the situation is bad enough, and is one which would have been impossible twenty years ago. For the present, the County Council have succeeded in setting up strife between the Commons and the Lords; thereby preparing the way for future conflicts, more distinctly political. The subject is engaging considerable attention; and it brings on, in a fresh phase, the controversy which in 1880 led to important political consequences. *The Times* has some pregnant remarks on the subject, objecting to the use of Private Acts to effect important changes in institutions like the Thames Conservancy. "In the present case," says *The Times*, "the "House of Lords has, in fact, endeavoured to defend the "other branch of the Legislature, along with itself, from "encroachments which the House of Commons can ill "afford to permit, but which in its present condition it has "neither the sagacity to perceive nor the spirit to resent,"

Some progress appears at length to have been made towards the acquisition by the Portsmouth Corporation of the local water-works. At an interview which took place last week between the Directors and a special Sub-Committee of the Town Council, the former were induced to state the terms on which they would recommend the shareholders to part with their property. Briefly, the Company would be advised to sell if the proprietors receive so much Corporation 3 per cent. stock as will produce an income equal to that which they (the shareholders) are now receiving. Should the transaction be carried out on this basis, it is estimated that new stock to the amount, in round figures, of £1,000,000 will have to be created by the Portsmouth Corporation. Of course, there may be considerable discussion, and possibly some modification in the terms of purchase, before the project is carried into effect; but there is little reason to doubt that the Town Council will adopt the recommendation of their Committee, provided expert opinion supports the value which the Company put upon their undertaking. The original works could have been acquired by the Corporation for quite a small sum forty years ago. But the opportunity was allowed to slip; and the present Company, which started with a capital of £80,000, has from the date of its incorporation enjoyed a period of uninterrupted progress and prosperity. The actual share capital now amounts to £303,750, only £3 10s. having been called up on each of the 22,500 shares issued under the Company's Special Act of 1883. The loan capital stands at £101,250; and the reserve fund (invested in Consols) is rather over £12,000. For the last half year, the gross income was £23,023, which after providing for the cost of maintenance, distribution, and management, left a balance of £15,066 as the half-year's profit. In round figures, therefore, the shareholders possess a property producing a net income of about £30,000 a year. In view of this handsome revenue, and of the fact that the Company supply, on an average, 5½ million gallons of water per day—and they could probably furnish nearly treble this quantity—it is obvious that a big price ought to be paid if the Corporation proceed with the proposed purchase. The position of the Company is strengthened by the fact that there is no complaint in regard to the quality of the water or the conditions of the supply. Unless, therefore, it suits the shareholders to sell, their position may be regarded as impregnable. Another special element in the Portsmouth case is that a large portion of the revenue is drawn from the Dockyard and other Government departments, and is therefore free from uncertainty by reason of changes in the population or the fluctuations of the building trade.

The Official Inspectorship of Gas-Meters for Manchester.—Mr. S. Dyson has been appointed to the vacant Inspectorship of Gas-Meters by the Manchester City Justices, in succession to Mr. James Urquhart, whose death was announced in our columns a few weeks ago. Mr. Dyson has been principal assistant to Mr. C. R. Bellamy, the Official Inspector for Liverpool, for the last twelve years, and was formerly in the gas departments of the St. Helens Corporation and the London and North-Western Railway Company.

North of Ireland Association of Gas Managers.—The annual meeting of this Association will be held at Coleraine next Tuesday, under the presidency of Mr. W. S. Stormonth, Engineer and Manager of the Coleraine Gas-Works. Our readers will see, by the advertisement which appears elsewhere, that, in addition to the Inaugural Address, there will be two papers—one by Mr. C. B. Outon, describing the new oil-gas works at Inchicore, Dublin; and the other by Mr. A. Main, of Glasgow, tracing the history and development of cooking by gas. There is also to be a lecture by Mr. W. Ivison Macadam, F.R.S.E., &c., of Edinburgh, on "Processes for Manufacturing Gas from Oil, with Special Reference to the Peebles Process." These items, with the ordinary business, make a full programme; and the members will assemble half an hour earlier than usual to get through it. After the business, there will be the customary dinner. The Association are making a new departure this year in the shape of an excursion in brakes to the Giant's Causeway on the day after the meeting. Time will be afforded for inspecting some of the principal geological features of this truly wonderful spot, which will have been visited this year by more members of the gas fraternity than ever before; and luncheon and tea will be served. It is to be hoped that the technical business of the meeting will cause a good number of members to attend; and that the attractiveness of the second part of the programme issued by the Hon. Secretary (Mr. J. Whimster, of Armagh) will induce them to stay another day, in order to show their appreciation of it in the company of their lady friends.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 231.)

THE past week has embraced a period of tension and suspense which has not often been surpassed on the Stock Exchange; but fortunately the worst forebodings have not been realized, and the imminence of the danger has been avoided. The opening was gloomy indeed; and as prices were falling rapidly day by day, and failures were being announced with alarming frequency, it was thought that the current settlement would be most disastrous. Happily, however, the total of failures proved actually fewer than in the preceding settlement; and, in addition to this, the excessively low prices brought in some buyers. The result was that a turn for the better set in; and the close showed a modest recovery. It is to be hoped that the worst is now over, and that, with affairs in the East promising a pacific solution, further progress may be made, though more financial difficulty is threatening in the United States. Gold will be required there, and the prospect is hardening the Money Market here; but there is at present no prospect of any scarcity to meet all reasonable demands. The Gas Market has not suffered in any way; the tendency being rather in the other direction. Business has been below the average, although the opening day showed a degree of activity affording a better augury. Changes in quotation are few and slight; but they are in the upward direction. Gaslight "A" was only moderately dealt in; but it was firm, and the price rose from 227 to 230½ at the close—the quotation marking an advance of one point. The report and accounts for the first half of the year thus appear to have been received well. The secured issues were very quiet and unchanged. South Metropolitan were more brisk, especially the "C," which was in demand at better prices. Nothing was done in Commercials. The Suburban and Provincial Companies were inactive and wholly unchanged. The accounts of the Brentford Company do not reveal a very prosperous half year; the business having fallen off about 4 per cent., with the result that the Company's earnings are nearly £3000 short of the sum required to provide the dividend. Among the Continentals, Imperial was by far the more active, especially at the opening; but none made any change. The rest offer no feature, except that Buenos Ayres resumes its position in the dividend-paying list. Business in water was almost stagnant; but some respectable advances in quotation have been accomplished.

The daily operations were: The Gas Market opened with a fair promise of activity—Imperial Continental being much in evidence; but quotations did not move. Tuesday's transactions were spread over more issues; prices being a fair average. Wednesday became quieter; and still quotations remained unchanged. Grand Junction Water rose 1. Thursday's business was of the most meagre description—only two or three transactions being marked. But Gaslight "A" advanced 1; and South Metropolitan "C," 3. East London Water likewise rose 3. Friday's business was better, but still below par; and quotations did not move. Lambeth Water gained 2; and Southwark, 1. Saturday was a good average; and all quotations closed unchanged.

ELECTRIC LIGHTING MEMORANDA.

The Powers of Electrical Tramway Companies—A Reproof for Electrical Expert Witnesses—The Bradford Extension Scheme—Large Gas-Engines for Electric Lighting.

THE Chairman of Committees of the House of Lords has lost no time in acting upon the recommendation of the Joint Committee of both Houses respecting the conditions under which electrical tramways are to be sanctioned by Parliament, and has insisted upon the insertion of the protective clause in the Bills for such schemes now being promoted. This was opposed by the promoters; but the justice of the requirement is obvious. If there is any danger attending the working of electrical tramways which the recommendations of the Committee can avert it is right that these should be made use of immediately. It would be an absurdity if electrical tramway schemes that happen to be in Parliament this session, and which, in fact, brought about the appointment of the Joint Committee, were to escape the imposition of whatever restrictions the Committee might have deemed necessary in the interest of the public safety, while similar projects introduced next year would come under these restrictions as a matter of course. We are not quite satisfied that all has been done that could be desired for the protection of gas and water pipes; but more experience is desirable before insisting further upon this point. The gas industry does not wish to stand in the way of the application of electricity to tramways by conjuring up apprehensions of a danger that may never amount to anything serious; but, in view of the terrible consequences to the public that might follow upon the silent and secret destruction of gas mains and services by electrolysis, it is imperative upon engineers charged with the care of gas distribution plant in the vicinity of electric mains to keep watch upon the new peril.

The leading electrical experts have been pitted against one another again in the Law Courts during the last week or two, in connection with a couple of actions for nuisance brought against the Electricity Supply Corporation by neighbouring householders, who alleged that they suffered injury in various ways from the vibration set up by the defendant Company's machinery. In one case, the Judge warned the jury not to pay any attention to the expert evidence, but to make their minds up as reasonable men upon the facts sworn to by other witnesses. This is the sharpest reproof to the learned gentlemen who are accustomed, in the way of business, to swear according to their client's interest, that has been delivered in open Court. It is the publicity that gives the denunciation of experts' evidence its sting, because Mr. Justice Cave's censure was, after all, only a commentary on Lord Justice Bramwell's famous classification. Electrical experts are no worse than others who have taken up the same line of practice; but it is high time that litigants came to a mutual understanding on this matter. It is very commonly said that the right place of the expert is the Assessor's seat beside the Judge; but in this position he would be beyond the reach of cross-examination, which is good for professors. Perhaps the easiest way out of the difficulty would be found by the parties agreeing to have an expert nominated by the Court to inquire into the technical features of a case, who should afterwards give evidence subject to examination by both parties; but the point is notoriously a difficult and delicate one. It would be most desirable for Courts of Justice to be guided on occasion by the light of Science, which cannot lie, without having the light filtered through interested men, to whom the restriction does not apply.

The "doctors"—represented in this instance by Mr. Baynes and Mr. Shoolbred—have differed so hopelessly as to the best method to be adopted for the extension of the Bradford electric lighting undertaking, that an umpire of irreproachable authority, in the person of Lord Kelvin, had to be called in to decide between them. His decision was in favour of the three-wire system recommended by Mr. Baynes; and it is to be hoped, for the sake of the patient ratepayers of the town, that when Mr. Baynes has his way the service will be carried on a little more profitably than has been the case hitherto. What is the precise advantage on the score of economy of Mr. Baynes's plan over that of Mr. Shoolbred we cannot say; but we understand that the latter is of a distinctly more experimental kind than the former. Bradford does not want any more experiments in this direction. But it does want a reliable paying electric lighting concern; and if Mr. Baynes can help the Corporation to this desirable consummation, he will deserve the best thanks of this sorely worried body.

Messrs. Dick, Kerr, and Co., Limited, write to the *Electrical Review* in connection with the discussion upon the use of gas-engines for central station electric lighting which our contemporary has been encouraging in its columns of late, to state that they have in hand several large gas-engines intended for this class of work. They also mention a gas-engine for mill work to indicate about 650-horse power as being well advanced. For electric lighting stations, however, the firm state their opinion that "engines from 250 to 500 horse power will be found most suitable and convenient to handle, and the best for sub-stations, working with cheap producer gas supplied from a central depôt." These observations raise the whole question of economical electric lighting by gas power, and appear to call for some comment. We have no difficulty in admitting that if gas-engines of the power mentioned can be made "suitable and convenient to handle" in central stations, the prospect of the rapid extension of the use of such motors becomes much brighter than it appeared (say) at the Crystal Palace Exhibition, when all the gas-engines shown compared very unfavourably in point of power with the steam motors. Gas-engines from 250 to 500 horse power are as large as most electric lighting stations require; but it becomes a question how such motors are to be supplied with gas. Coal gas is not to be considered in this connection; being too costly. Producers on the spot are not to be thought of, and Messrs. Dick, Kerr, and Co. seem to think it the most natural idea that "cheap producer gas" should be supplied to scattered gas-engine stations from a "central depôt." All this debate about the economy of distributing electrical energy by means of gas-engines is chargeable to Mr. Denny Lane's account. He has proved that, in the case of small gas-engines, power can be cheaply distributed through the agency of the ordinary town gas-mains. The proof fails, however, for gas-engines of over 50-horse power, for these are no longer superior to steam-engines in regard to running expense. The question now is whether producer gas, which is admittedly the cheapest agency for driving engines of about 100-horse power, when generated on the spot, is equally eligible when generated at a "central depôt," and distributed at a distance from the point of origin through the ordinary kind of mains. Mr. Denny Lane has never said so, nor has anybody else ever proved it to be so. What electricians and gas-power partisans have to bear in mind in relation to this question is that the moment anything becomes chargeable to "distribution," in a gas-power scheme, another set of conditions arises which involves the greater condemnation for producer gas the farther it has to be taken. This kind of fuel will not bear transportation, to say nothing of storing. It is not good enough for either. If gas for the production of power is to be made at what is called a "central depôt"—which probably means a place far enough

from the centre of a town to escape the risk of actions for nuisance—it is not producer gas that will serve the turn, but something containing less nitrogen—say, water gas. It is easy to blunder in considering this class of topics in the abstract. An actual example is necessary to "fix the idea," as the French say; and we have small doubt that such an illustration will be offered before long. When this occurs, we shall be ready to discuss the scheme on its merits. At present, the whole matter, so far as it concerns the production by gas power of electricity in quantity beyond the economic range of the coal-gas engine, is very much "in the air."

THE MEETING OF THE NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

The meeting of the North British Association of Gas Managers in Dundee last Thursday, of which a report appears elsewhere, was the third which has taken place in that city. In 1875 the Association held their fourteenth meeting there, under the presidency of Mr. George R. Hislop, of Paisley; and in 1885 they again met there, under the presidency of Mr. John M'Crae, Engineer and Manager of the Dundee Corporation Gas-Works. Two years ago it was resolved at the Edinburgh meeting that the meeting in 1892 should be in Dundee; but the Committee, in view of the proceedings which were to take place at Stirling on the second day of the meeting, in connection with the unveiling of the bust of William Murdoch, sent out circulars to the members, suggesting that Stirling should be selected. The response to the *plébiscite* was the approval of the Committee's suggestion; and accordingly the Association met last year at Stirling. It was then agreed that this year's meeting should be held in Dundee.

The gathering last Thursday was a large one—it was said to be the largest ever held under the auspices of the Association. The explanation of the unusual turn-out was, no doubt, a general expectation that something valuable would be learned from the papers by Mr. W. Young and Mr. A. Bell, jun., of Peebles, upon their oil-gas process, which gas managers in Scotland are proud of, as being the invention of one of their countrymen. Another reason was to be found in the very large increase in the membership which was announced by the Secretary. Members looked surprised as Mr. Carlow read over the list; and well they might, for such an addition to the roll is quite an event in the history of the Association. It was evident either that someone had been working hard, or that there had been a sudden access of interest in the Association. Which of these circumstances it was, was not made apparent; but if the latter, it was the more gratifying because of the spontaneity of the movement. One effect of the large augmentation of the membership was visible on the face of the meeting, in the youthful appearance which it presented. This was also a good augury for the future of the Association; for if the young men of the profession take an interest in its affairs, there will be good reason to expect a continuation of well-filled meetings. The older members were not present in such force as could have been wished. Mr. Jesse Hall, of St. Andrews, was an attentive listener; but he took no part in the proceedings. So was Mr. G. T. Myers, who has lately retired from the management of the Broughty Ferry Gas-Works. On the other hand, Mr. T. Whimster, of Perth, though little more than half an hour distant, was unable to put in an appearance. This was to be regretted, because of his being one of the original members of the Association. Mr. G. R. Hislop, of Paisley, and Mr. S. Stewart, of Greenock, were both unfortunately detained at home by business; and Mr. F. T. C. Linton, of Leith, and Mr. A. Smith, of Aberdeen, were regrettably absent on account of indisposition. It was, however, a circumstance which should fill the Committee with gratification that such distant members as Mr. W. A. Valon, of Ramsgate, Mr. J. Hepworth, of Carlisle, and Mr. D. Terrace, of Middlesbrough, should have honoured the meeting with their presence; as also that Mr. John West, of Manchester, the President of The Gas Institute, should have sought to repay the kind reception he met with in Edinburgh two years ago, when he explained his drawing and charging machinery to the Association, by making an effort to be present, though at much personal discomfort, considering the state of his health. There was another pleasing feature in the return, after long absence, of Dr. Stevenson Macadam, of Edinburgh, one of the honorary members of the Association.

Not only was the size of the meeting a source of gratification, but the quality of the proceedings was such as to leave nothing but the most pleasant recollections. Mr. Young and Mr. Bell did not arrive from Peebles in time to take their place at the head of the programme; and Mr. Keillor, of Nairn, was put up to give his most interesting paper on "Prepayment Meters," which led to a short but valuable discussion. After it Mr. Young read his paper on the scientific side of the oil process; and Mr. Bell gave his communication upon its practical side. This was followed by a few remarks by Mr. J. Mackay, of Peterhead, on his experiments with oil. At this stage the luncheon hour arived; and the members went off to visit the Dundee Gas-Works, where they were hospitably entertained by the Dundee Gas Commissioners. Returning to the meeting-place, the discussion upon the oil process was opened by Dr. Stevenson Macadam, who, in a pithy speech, gave expression to a friendly criticism, in which he stated his regret that by Mr. Young's process there should be so much as 25 per cent. of the material that was put into the retort left in it in the form of carbon. Several speakers wished for more information as to the expense of the plant, the cost of working, and the results obtained by the use of Russian oil; to all of which Mr. Young replied in a manner that showed his thorough acquaintance with the subject. Afterwards Mr. D. M. Nelson, of Glasgow, made a communication on the subject of the Yeadon revolving gas-retort, to which Mr. David Terrace, of Middlesbrough, who has experimented with the retort, also spoke. Mr. Terrace confessed that he had not obtained such good results as Mr. Nelson gave; but this was explained by Mr. Nelson as being due to the fact that Mr. Terrace used the most refractory and the least satisfactory coal to be found in the district. The discussion on the Yeadon process over, Mr. J. Ballantyne, of Rothesay, followed with a carefully-prepared paper on "Cooking by Gas," which, however, was not concluded till after the closing hour; and the discussion upon it was, on the motion of Mr. R. Mitchell, of Edinburgh, adjourned till next year's meeting. There was one other paper down on the programme—on "Automatic Appliances for Small Gas-Works," by Mr. Gilbert Little, of the New Conveyor Company; but, on account of the lateness of the hour, the author agreed to allow his paper to be taken as read. It was, however, in print; and members were furnished with copies of it. This brought the technical portion of the meeting to a close. It should be mentioned that the Committee, in their report, dealt in a most exhaustive manner with the vexed subject of coal analyses, and laid down a series of conditions which are well worthy of perusal, and which the members adopted without remark. These conditions will be found in the Committee's report, the chief features of which are given in another column.

In the evening, the members dined together in the Queen's Hotel, and had as their guests Lord Provost Matthewson, of Dundee, Provost Keith, of Arbroath, and Mr. J. Mitchell, Convener of the Finance Committee of the Dundee Gas Commission. Lord Provost Matthewson created much merriment when he confessed that he did not know what enrichment of gas meant, unless it was the getting of better gas for less money. After dinner, the members were escorted by Mr. M'Crae to the Corporation electric lighting station, which was open for their inspection. The station was found to be in the most perfect order—everything working smoothly; and it was generally remarked that the whole of the plant and arrangements were particularly excellent, and that the entire station was very neatly disposed. This was the last item on the long list of the first day's events.

Mention should certainly not be omitted here of the exhibition, in the meeting-place, by Messrs. W. and B. Cowan and Messrs. Alder and Mackay, of their prepayment meters, constructed upon the latest system, in which the consumer may pay for a given quantity of gas by inserting successive pennies; the meter automatically stopping the supply when the quantity paid for has been passed. Both the exhibits seemed to be efficient machines, and attracted a good deal of attention. One mistake was made, and that was in having them in the meeting-room, where they could only be inspected when the business was not in progress. Had they been outside, in an ante-room, with an attendant, they would have been seen by more of the members.

The second day's proceedings consisted in an excursion to the Dundee Water Commissioners' reservoir at Monikie. The weather was dull, but not unpleasant.

Mr. T. Trewhitt a Justice of the Peace.—We learn that Mr. Thomas Trewhitt, Secretary of the Hartlepool Gas Company, has been appointed to the Commission of Peace for the borough of West Hartlepool.

Death of Sir T. Martineau.—We regret to record the death, at the age of 66, after a long and painful illness, of Alderman Sir Thomas Martineau, Chairman of the Water Committee of the Birmingham Corporation. Sir Thomas (then Mr.) Martineau was appointed a member of the Committee in 1879, when Alderman Avery was Chairman. On the latter relinquishing the position in 1881, in order to accept the mayoralty, Mr. Martineau held the post for the time being. On the retirement of Alderman Avery in 1887, he became for the second time Chairman of the Committee; and his prolonged and arduous labours in connection with the great water scheme which was sanctioned by Parliament last year will be fresh in the recollection of our readers. Sir Thomas was until recently the head of the well-known firm of solicitors. His municipal record was a brilliant one; and he was three times Mayor. During his third term of office, Her Majesty visited the city and laid the foundation stone of the new Law Courts, in commemoration of which he received the honour of knighthood. Shortly after this, Sir Thomas showed signs of impaired health; but it was hoped that, by rest and care, many years of life and useful work were still before him. Some months ago, however, unfavourable symptoms disclosed themselves: and he was eventually obliged to give up active duty. He passed away last Friday afternoon, at his residence at Edgbaston, to the deep grief of an attached family and a large number of friends, and to the great loss of the city generally.

THE ALKALI ACT INSPECTOR ON AERIAL SANITATION.

All who are interested in the important subject of aërial sanitation may be recommended to study the recently-issued report of the Chief Inspector under the Alkali, &c., Works Regulation Act. We have already published the portions of Mr. A. E. Fletcher's report which deal with the technical questions arising in connection with the conduct of manufactures which are a source of noxious fumes; and in another column will be found extracts from sub-inspectors' reports bearing upon the same class of subjects. We now propose to discuss Mr. Fletcher's statements generally, with a view to bringing forward certain matters to which the Chief Inspector has paid special attention. In the first place, it should be mentioned that among the other problems of aërial sanitation studied by Mr. Fletcher is included the vexed question of the effect upon public health of coal smoke and the other products of combustion. Some sanitarians as is well known, believe that these products act beneficially upon the air of crowded places, and that the sulphurous acid gas in particular operates as a disinfectant and germ destroyer. Others, on the contrary, hold that the action of all products of combustion upon the atmsphere is deleterious. Hitherto no positive evidence has been forthcoming in support of either view; and it cannot be said that the present report supplies the deficiency. All that Mr. Fletcher has been able to do in this way is to compare the vital statistics of the district of Widnes—the "shocking example" of those writers in the newspapers who argue that the operations of chemical industry are injurious to the health of workers and residents in the neighbourhoods devoted to it—with those of other Lancashire districts. He has been able to draw from this comparison the conclusion that "although the smoke of Widnes, arising from the combustion of a million tons of sulphurous coal annually, and the habits of the poorer portion of the population, combine to render the lower parts of the town most unfavourable to the health of the children, yet the general mortality of the place compares favourably with that of other manufacturing towns in Lancashire." This is, at least, negative evidence in favour of the Widnes atmosphere. There has been a desperate attempt recently by certain "popular" newspapers to get up a sensation about the alleged "death-traps" of the chemical trade; but Mr. Fletcher has statistical tables to prove that chemical workers enjoy, on the whole, as long life as most orders of the community. He cites the example of the employees of the Oldbury Alkali Company to show that even among the men whose ages lie between 45 and 65—that is to say, at the period of life when long exposure to chemical fumes might be expected to tell—the death-rate does not exceed 20·7. Thus another delusion is disposed of.

Mr. Fletcher has a good deal to say on the subject of black coal smoke, which is objectionable, as he says, both on account of the sulpurous acid and because of the "dirt and sadness" which it carries with it. He admits that no practical remedy has yet been found for the former evil; but he declares that the blackness of coal smoke is curable in the case of industrial furnaces. The remedy is mechanical or gaseous stoking. With regard to the former, it is instructive to note how the interest of fuel users in smoke-prevention appliances has been enlisted, not by the direct profit derivable from the realization of the old ideal of "burning their own smoke," which is imaginary, but by the incidental economy of mechanical stoking. In the outset, there is a certain additional prime cost and an increase of working expenses attendant upon the adoption of mechanical stokers which handicap them, when their only recommendation is merely the saving of the smoke. Happily this is now a secondary consideration, since it is found that with good modern mechanical stokers the smokeless combustion of inferior descriptions of coal can be easily effected. Mr. Fletcher cites the case of a large chemical works having 200 fires, the smoke from which "shrouded the whole district in its pall," but which are now smokeless. A substantial saving of 10 per cent. in the cost of firing has also been secured—not as the old smoke abatement enthusiasts would have expected, from a reduction of the quantity of fuel consumed, but in its cost.

The automatic smoke-preventing rubbish-consuming furnace is the furnace of the day, as Mr. Fletcher evidently perceives, but does not say this in so many words. He tells how he has taken a friendly interest in various improved systems of firing, and has tested the smoke gases in many instances. He lays much stress upon the importance of this proceeding, and urges coal consumers to carry out smoke tests of their own furnaces at frequent intervals, with a view to the discovery of defects in working which cannot otherwise be detected. It is not Mr. Fletcher's duty to recommend or to dilate upon the merits of any particular make of mechanical stoker; but we venture to express the hope that in his next report he may have something more to say respecting the working of dust and rubbish burners and gaseous fuel arrangements.

It is difficult to exaggerate the importance of the dust furnace or to realize the effect the system may conceivably have upon every considerable national industry requiring the consumption of large quantities of fuel. The saving in the cost of fuel which everywhere attends the introduction of these furnaces is only a small part of the benefit resulting from the successful solution of the problem of burning carbonaceous dust to advantage. The waste of coal in the processes of winning and handling has always been a grief to economists. It has not only enhanced the price of marketable grades of coal by the allowance necessitated for the large proportion of small stuff that could not even be given away, but it has also meant a deplorable sacrifice of much of the irrecoverable coal capital of the world. Now a cure has been found for the evil; for when it is recorded that pumping-engines in South Staffordshire can be driven by means of coal smudge delivered into the stoke-holes at the price of 1s. 6d. per ton, it is as much as to say that a fresh source of fuel has been discovered, and 20 per cent. added to the duration of the Coal Age in Britain. This is progress, in the best sense of a much abused term.

The success of the dust furnace for boilers and similar applications means a good deal more than appears on the surface. It is a serious blow to the briquette fuel industry, which was just beginning to assume considerable proportions in this country; and it is no encouragement to the inventors who have been working so long in the direction of adapting gaseous fuel to steam raising, &c. Time was when, on account of its smokelessness and regularity of action, gaseous fuel seemed to take the fancy of some steam users. We believe, however, that this time is fast slipping away, even if it has not already gone, and that the mechanical furnace burning small coal, with supplementary machinery for lifting, storing, and conveying this material, is in the ascendent. Nor is there anything to complain of in this circumstance. It is useless to force gas or anything else into work for which it is not naturally suited; and gas-boilers never paid the user. We shall not hear much more of them.

The advocates of clear skies for our manufacturing towns should be thankful to Mr. Fletcher for the proofs he has supplied in this report that the abolition of the nuisance of black coal smoke is at last feasible and profitable, in the case of the majority of furnaces. To do them justice, the partisans of the Smoke Abatement movement never rested their cause upon the purely æsthetic and sanitary arguments for a clean town atmosphere; but always argued that the suppression, or, as they usually put it, the consumption of smoke was a means of economy. They are justified at last, but not in the way they thought. The main thing is, however, that now local authorities need not be deterred, by a sense of the consideration due to the manufacturer's pocket, from insisting that his steam-boiler furnaces shall cease from giving offence to his neighbours. The factory owner who should prefer to stoke his boilers by hand with costly, smoky coal, instead of having recourse to the automatic furnace burning coal or coke dust and small, deserves to be haled before the Magistrates more than many a victim of police vigilance.

As was mentioned in our abstract of his report, Mr. Fletcher goes out of his way this year to remark upon the sulphurous atmosphere that is allowed to half poison travellers by the Metropolitan Railway. He introduces this subject by observing that an Inspector under the Alkali Act, accustomed as he is to notice the presence of noxious gases, and to seek a method of avoiding or of removing them, cannot travel in these mephitic tunnels without wondering that something is not done to improve their atmosphere. If such an idea occurs to an alkali works inspector, it also strikes a gas engineer with even greater force; for the latter, if habituated to work under the "sulphur clauses," can hardly use the Metropolitan Railway or pass one of its blow-holes without wondering what his company would suffer if they were to allow their sulphur to run up in the same proportion as the Railway Company. Unhappily, Mr. Fletcher is unable to suggest a remedy for this regrettable state of things; and what he cannot do in this way must be regarded as beyond the reach of science. If there were a remedy, it would be applied as quickly as the apparatus could be put together. Experiments were tried some time ago in the direction of making the locomotives exhaust into a closed trunk main aspirated by fixed engines; but nothing has come of it.

A Vacancy on the Board of the West Kent Gas Company.—The Directors of the West Kent Gas Company have just lost their most recently-elected colleague—Mr. Walter Greenberry—who died on the 22nd ult., in his 71st year, after a short illness. The deceased had been one of the largest shareholders in the Company from its formation; and in March last he was elected to fill the vacancy caused by the death of the Chairman (Mr. James Page).

Visit of the Association of Municipal and County Engineers to the Globe Tube-Works, Wednesbury.—On the occasion of the recent annual meeting of the Incorporated Association of Municipal and County Engineers at West Bromwich, the members were invited to the Globe Tube-Works of Messrs. J. E. and J. Spencer, where they were shown the new tube-mill which has lately been erected for making large-sized lap-welded iron and steel tubes. The visitors inspected the process of making up large steel tubes 21 inches in diameter and ¾ inch thick, each weighing nearly a ton; and they displayed much interest in seeing a steel plate bent and welded to a complete tube. These tubes were intended to contain compressed air at a pressure of upwards of 1000 lbs. per square inch. The members were also shown a special arrangement of tubes for sewer ventilation; and, in addition, they witnessed the manufacture of all kinds of gas, water, and steam tubes and fittings, well tubes, &c.

NOTES.

Solid Ammonia Washing Powder.

An interesting and gratifying testimony to the value of suggestions thrown out in the editorial columns of the JOURNAL for the improvement of the industry of gas manufacture and the residual products, has reached us in the form of a packet of washing-powder bearing the name of "Brothers' Solid Ammonia." This preparation, which is a patented speciality of Mr. William Brothers, of Rawtenstall, is intended as a means of extending the household applications of ammonia, as advised by us on March 14 last, with a view to creating and fostering a town demand for this commodity. According to an analysis of the powder by Mr. G. E. Davis, it consists of absolutely fure bicarbonate of ammonia, which is usually sold as an opalescent or semi-transparent solid substance. Mr. Brothers says he has prepared the material for household use by fine grinding; and the packets have printed instructions for its use. By these directions, a pint of boiling water is to be poured upon a tablespoonful of powder; and the resultant solution is diluted as required for various uses. This is a much cheaper way of obtaining ammonia for washing purposes than the bottled preparations, which are doubtless handy and useful, but necessarily entail a good deal of expensive packing and carriage. Moreover, Mr. Davis states that bicarbonate of ammonia is an exceedingly good bread-raiser, for which purpose it would have been largely used ere this if it had been obtainable in quantity at a reasonable price. Thus the remarkable consequence follows that "the clothes of the household may be washed and the bread may be baked out of the selfsame "packet" of bicarbonate powder, which must not be comfounded with the ordinary commercial article—the sesqui-carbonate—to which it has scarcely any resemblance. A large sale is anticipated for this latest of washing-powders, which has the recommendation of not being a soap, or containing any soda to hurt the skin.

Producer Gas-Engines in France.

Now that the attention of power users has been directed to the economy of gas-engines worked with producer gas, various questions are cropping up in regard to this description of power plant —among others, that of the durability of the machinery after prolonged and regular working. It may be recorded that several French mechanical engineering firms are exploiting this class of machines, with most encouraging results. Messrs. Delamare, Debouttеville, and Malandin, Fontaine-le-Bourg, have a make of engine which they have adapted to work with producer-gas; and they claim that one of these machines has been constantly running at a flour-mill near Marseilles for five years without substantial repairs. When the piston of the engine was recently removed, the amount of deposit in the cylinder was found to be negligible. Messrs. Matter and Co., of Rouen, are making engines to work with producer gas up to 200-horse power; using generators on the Buire-Lencauchez system. In this generator no steam-blast is required; but an air-injector with the evaporation from a water ashpan supplies the place of the blast, and the resultant gas (the fuel being inferior local coal) contains 45 per cent. of combustible constituents. The working of theproducer is automatically regulated in connection with the engine. It is recorded that the difference between the consumption of Welsh anthracite and low-class French coal per horse power is much less with this system than might be expected.

The Manufacture of Arc Light Carbons.

The carbon deposit in gas-retorts is usually considered by gas managers a "bye-product" of a peculiarly unprofitable and objectionable kind. From reports that have recently appeared respecting the operations of a concern called the English Carbon Company, Limited, of Brymbo, near Wrexham, it would appear, however, that in certain circumstances the direct manufacture of this peculiar product of coal carbonization may be profitable. It is stated that the demand for arc light carbons is so large, and is so constantly increasing, that English electricians can no longer bring themselves to acquiesce in the continuance of this manufacture in foreign hands. It has several times been attempted to establish the arc lamp carbon industry in this country; but hitherto without commercial success. This is admitted to be remarkable, having regard to the facts that in English coal there exists the best possible material for the production of arc carbons, and that the retorts in English gas-works yield the intermediate product—the carbon itself—in a most suitable state for further treatment. The Brymbo undertaking is to make a fresh attempt with machinery of the most approved type, and with "ample supplies of the bye-products obtained by carbonization of Welsh steam coal." The carbonization of steam coal is not a common process, but then, carbonization with a view to the production of carbon is not a common industry.

An American Test of a Producer Gas-Engine.

Further light on the working of gas-engines with producer gas under varying conditions is supplied by a report of Mr. H. W. Spangler, published in the *Journal* of the Franklin Institute, upon the testing of a 100-horse power "Otto" engine, by Messrs. Schleicher, Schumm, and Co., by students of the Mechanical Engineering Department of the University of Pennsylvania. It was a two-cylinder gas-engine, with horizontal cylinders one directly over the other; and the producer was Taylor's patent (No. 4), consisting of a cylindrical shell lined with fire-brick, the bottom being closed by a revolving grate. The supply of air for the producer was derived from a positive blower, driven from the works shafting; and the steam was obtained from the waste heat of the gas, utilized for this purpose in a kind of boiler-washer, according to a system devised by Mr. Paul Winand, of the "Otto" works. The ignition of the gas in the engine was effected by a spark from Edison-Lelande cells. The coal used in the producer gave by analysis 3·18 per cent. of hydrogen, and 84·76 per cent. of total carbon. The testing of the plant was done with great care; and the results are exhaustive, both as regard the efficiency of the producer and of the engine. The former was 69·1 per cent.—that is, the heat in the gas obtained from a pound of coal gasified showed this proportion of the original. Of the heat in the gas, 27·7 per cent. was turned into indicated horse power; and the efficiency of the machine was 72·4 per cent. So that the efficiency of the whole plant was 13·66 per cent. of the original power in the coal. The coal consumption, per indicated horse power, was 0·9511 lbs., or 1·315 lbs. per brake horse power per hour, which difference would be reduced as the engine, which was quite new, was brought into better working order.

COMMUNICATED ARTICLES.

FOUR YEARS' "PROGRESS" OF WATER GAS.

By Mr. R. S. Moss.

Water gas, pure and simple, for manufacturing purposes, has proved just as unsuccessful as it did for lighting; and yet we find men whom everyone considers shrewd and practical still trying to bolster up this commercial failure. Their pertinacity and determination appear at first sight to be in exact ratio to the number of its failures. Such men are to be admired for their determination; they no doubt feel that failure in anything they lend their name to reflects upon their noted shrewd character—causing public opinion to doubt their ability and able judgment. Can one wonder that such men will not think of failure; and would, we grant, succeed in overcoming any difficulty if human endeavours to do so were possible? Such men are so taken up with the one idea of achieving success that they lose sight altogether of its hopeless character; and thus their judgment for the time being can scarcely be considered sound, or their opinions as fairly balanced. They do not care to be told they are wrong, but inadvertent, in not examining both sides. They are men who feel (and rightly so) that public opinion is far more to them than any monetary value they may have at stake. However, let us turn from this diversion (for which I apologize) to the subject proper. Water gas for manufacturing and heating purposes has altogether failed in this country; or, at least, outside the Leeds Forge. Since the formation of the Syndicate, it has been applied for steel smelting, puddling, welding, drying, and singeing cloth goods; the success financially has in all cases been *nil*.

Take steel smelting, for instance. We were told in the prospectus that, among others, at Baron Rothschild's iron and steel works, at Witkowitz, in Austria, water gas for steel smelting was giving eminently satisfactory results. But yet, some four years later, we are told that at Messrs. Spencer and Newburn's steel works (where water gas has been tried for this same purpose) "that water gas is found unsuitable;" the explanation being offered that this is on account of the extreme length of a 30-ton furnace, which precludes the "full advantage of the high heating value of water gas being obtained." Yet this failure comes some four years after the published statement that "eminently satisfactory" results have been obtained. If this was so, why, in the face of "eminently satisfactory" results, should failure mark the first trial in this country? Does it not appear that the results, instead of being "eminently satisfactory," must have been "eminently unsatisfactory?" If not so, why deviate from the lines which it is stated give those "eminently satisfactory" results; for surely "eminently satisfactory" results are all that one requires? The erection and trial experiments with this plant have cost an enormous sum; and the verdict is "that it cannot be made to heat satisfactorily," although men of experience have been engaged! One would have thought, from the prospectus, that all detail of construction—as to limit and size of plant—had been practically decided before the formation of the Syndicate, and that all one required to do was to obtain orders for plant, suitable to any requirements, and the Syndicate would be pre pared to carry out the order successfully, In my humble opinion, I think it scarcely required the erection of a 30-ton furnace to prove that it would not work successfully with water gas, in spite of "eminently satisfactory" results from Austria. The nature of the gases one has to deal with presents to my mind a clear solution that failure must result. However, this article is not written with a view to showing why this is so, but rather to deal with what has been done.

We are told also that a puddling-furnace has been erected at the Glasgow Iron and Steel Company's works; and, "notwith-

standing very serious obstacles, it has been worked successfully," although, on account of the conditions under which the work is done, full advantage of water gas has not yet been attained. This furnace, we are told, was erected for a sum of £2777; and work can be done with it successfully. What a marvel! that one can do work with a plant which has only cost the modest sum of £2777. Is it not like burning diamonds to obtain heat, when a small piece of coal would do all that was required? An ordinary puddling-furnace can be erected for £80 to £100, and guaranteed to work successfully; but yet, in face of this, the Syndicate expect to find gentlemen willing to pay £2777. Then again we are told that water gas has been in "uninterrupted work for nearly twelve months without a single hitch at the Lancashire Waggon Works." I think one need scarcely say that the use of coal has been in successful operation during the greater part of this century without a single hitch; the cost for the same application of water gas being more than twenty times greater than where coal is used. Again, we are told that the Directors are negotiating a contract for the supply of a water-gas plant, for welding tubes. Here again the same reasoning will apply. The great cost of the plant will preclude any financial success. It is so easy and cheap, compared with water gas, to apply gas made by any of the numerous and efficient generators direct from coal, that (as far as I can judge) water gas can never succeed. This is the cause of those numerous applications which were received for water gas falling to the ground.

If anything is done at all, gas-firing direct will be the ultimate issue. For driving gas-engines it can never take the place of coal gas for small power; and for large engines the cost of the plant, compared with others in the market, is against its ever being adopted. Then again for brazing, welding, glass-blowing, &c., it is so easy under existing conditions of work to obtain a clean flame of sufficiently high temperature to preclude altogether any chance of success with water gas, requiring as it does such a heavy expenditure on plant; and to recommend it for smelting and refining precious metals, tempering wire, or singeing purposes, is (to say the least) imbecile, because the cost of the plant is far too great.

In fact, water gas can never compete successfully with generators using soft coal; and for all purposes for which water gas is specially adapted, gas from coal can be used with greater success, and at a cost of less than one-half. Water gas can never succeed as an illuminant unless carburetted; and this branch the Water Gas Syndicate have never seriously attempted. I have no doubt, had this been done, several plants might now have been working with more or less success. But so long as they attempt to apply water gas in competition with existing methods of manufacture followed in our modern coal-gas works, so long will they fail. The very limited number of cases where the demand exists for special high clean heats is altogether too small to ever make it possible for water gas to compete successfully with existing methods—the cost of the plant alone being fatal to its adoption. Had they turned their attention to carburetted water gas as an aid in coal-gas works, something better might have resulted. As it is, the field is now occupied by a plant of good efficiency, so far as plants of this kind go.

Looking the matter fairly and squarely in the face, it will be found that the cost of plant alone is so serious as to prevent its being successfully employed for any of the before-mentioned purposes—leaving alone the serious fact that its application is yet scarcely understood. This makes it impossible for one to guarantee results. The truth is our so-called crude systems are so much better than anything done abroad, apart altogether from the fact (which is a most important one) that conditions abroad, wherever water gas has been tried, are so totally different from our own, I venture to assert that, had they been placed in similar circumstances to ourselves, water gas would never have been a success. They, at least, would have known that extra cost of plant for a *minus* return would mean a loss.

I have before me the cost of work done at some of the most important works in the United States, which were taken from the books of different Companies—details of which I hope to publish shortly. Let it suffice at present to state these results prove to me that they are not able to work so cheaply as we do in England; and if soft coal had been so easy to obtain in the States as at home, water gas would never have been heard of as a serious competitor. Our work is done in the cheapest manner possible, and it takes advantage of, and was built upon, our proximity to a plentiful supply of coal and iron. Our methods of doing work were built up for the use of our most abundant fuel. Had we "struck" oil or natural gas, we should certainly have adopted our methods to suit the application of this kind of fuel in the best possible manner; and certainly the proper course to take is to develop our processes in accordance with our surroundings. This is what we find in every successful industrial centre—natural gas or oil is used wherever the conditions as to production, &c., lend themselves to its application at a cheaper rate than other fuels. We find water gas employed where anthracite is most abundant; carburetted water gas where oil and anthracite are cheap and easily obtained; soft coal where anthracite, natural gas, or oil is not found, or exists in such small quantities as to prevent it competing successfully with the cheaper and more abundant fuel—soft coal.

Any attempt in this country to replace existing processes by adopting what can only be described as artificial methods, peculiar to other countries where we find very different conditions to our own, except as an aid in special and well-known cases can only have one result, indicated by the word "*failure*."

I think the time has arrived for us to throw off these illusions regarding water gas, and recognize the proper importance of surrounding conditions—remembering that conditions existing at home are those which make our methods of doing work the best; not forgetting that the order of things in this country are in direct opposition to the successful adoption of water gas pure and simple.

THE WORLD'S FAIR AT CHICAGO.

By Our American Correspondent.

It would hardly be expected of the JOURNAL to enter into a very lengthy description of the World's Fair at Chicago, for the reason that the great mass of the exhibits would not be of technical interest to its readers. That the mere statement of this fact is not unaccompanied by a pang of regret, must certainly be freely admitted; for it means that, in the greatest Exhibition the world has ever seen, there is scarcely anything to indicate the existence of the grand industry to which those who peruse the JOURNAL are, in many instances, bound by lifelong ties. It means, further, that, as one traverses those colossal buildings of the White City, he feels as far removed from the gas business as if he were journeying through a trackless forest. For, in fact, there is little or nothing to show that gas is *the* lighting agent of the present day—little or nothing to show how the industry of gas lighting has kept pace with the progress of the world, and how the methods of manufacturing gas and the means of turning it into the active energy which we call light, have developed during the last few years. It also means that, while the visitor enters the Fair with an idea that the heat given out by burning gas is a nuisance, he leaves the grounds carrying that same notion with him, unexploded by a demonstration lesson on the utility of that heat for ventilating purposes; and, finally, it means that advantage has not been taken of the opportunity afforded to show the position which gaseous fuel is now occupying in the domestic economy of the world. When we reflect on this golden opportunity unimproved, and recall the fact that the White City has daily within its walls a hundred thousand persons, it is but natural that we should feel a tinge of keen regret when we say that the Fair is not of technical interest to JOURNAL readers. The reasons for this need not be entered upon now—the subject being one of too recent history to make it necessary; but we may say it is due to that spirit which human nature is so apt to encourage—that a matter which is of general interest and value to an industry is not of special interest to each individual member thereof. Hence the great bulk of the gas companies stood aside, conscious that the work should go ahead, but feeling that others should carry it along, or that it was of greater moment to some other company, and therefore should be fathered by those who expected to reap the greatest benefit. Consequently, we are brought to see a Fair in which gas has but little part.

To say that we submit gracefully to the inevitable, is a hollow mockery. We do not. As we wander through these huge edifices, which house exhibits from the four corners of the earth, and look at the surging crowd studying and admiring the work of man's hand, we cannot but feel what a great educational scheme it would have been—how far-reaching in its effects—if there had been shown here, on an appropriately grand scale, the various uses to which gas can be put, and what an obedient and labour-saving servant it is when properly used in the household, in the shop, and in the warehouse. To have had visitors go home with a right conception of the gas-meter, and with a full knowledge of how to obtain the proper amount of light from a given quantity of gas; to have had them see how easy it is to reduce cooking to a science by the aid of gas; to have convinced them, by demonstration, of what an important factor is gas, if properly used in household heating—this was the opportunity open to the gas fraternity, the golden chance which was allowed to pass unimproved. True, we may see an exhibit of the "Otto" gas-engine, which is not without merit; and we occasionally observe a gas-stove in an odd corner, which, of course, we readily recognize from familiarity with the business, but which the general public would pass, little wondering what it was. But these are of scant value in comparison with what might have been.

When we turn to electricity, however, we are at once filled with the idea of how immeasurably ahead in this regard are our electrical friends, and how completely they have captured the Fair. But when our eyes become accustomed to the glare, and we are able to study the electric exhibit with a discerning eye, we feel that there is possibly something lacking. That there is electric light in abundance, is certainly true; that, both within and without, the arc and incandescent systems vie with each other in their efforts to decorate and illumine, no one can deny. Yet there is a feeling that something is lacking. What is it? We had the privilege of being at the Fair on the evening of the so-called "opening" of the electricity building, though it had been open for several weeks, and witnessed the grand display of incandescent lights within, and of the arc and incandescent lamps without. We were

impressed by the capabilities of incandescent lamps for the production of novel effects. The tower of these small lights caused thousands of visitors to stand around and gaze as the operator manipulated the switches, and produced such rapid changes of the lights that the spectators were bewildered by the movements. The spectacle drew exclamations of surprise and admiration from the gathered throng; and it showed fully the capabilities of the incandescent system to produce novel and beautiful effects. And as, later on, we passed out of the electricity building, we again paused, and admired the great possibilities of electricity—for there was the vast artificial lake, with its branching-off lagoons surrounded by the graceful buildings, all illuminated with the electric light. On the walls were myriads of incandescent lamps, each doubled by its reflection in the water. Around the buildings were row after row of the same lights. They encircle the domes, and are held aloft in the open hands of the many statues—all showing how effectively electricity can be used to illuminate such a space. The scene was grand indeed; and it was made so largely by the profuse use of electricity.

Yet, as we wandered back through the electricity building, and realized that the edifice was given up exclusively to one industry, the feeling remained that there was something lacking; and we looked for the explanation in no fault-finding or carping spirit. That everything was on a colossal scale, was true; that there were large dynamos, and larger engines, was perfectly apparent. Still, there was a vague sense of disappointment. We had heard so much of this great building, to be devoted, as many supposed, entirely to electric light—so much of the vast sums of money which were being spent to properly represent the business within its walls—that we had looked forward to a visit to the Exhibition as a complete education in electric light matters. We expected to see here, grouped under one roof, all the uses to which electricians all the world over have been able to put this new light; to see it applied to all the various problems of household and domestic economy; and to go home with knowledge whereby we could double our ampères of output. But we did not; and here was the something that was lacking. Perhaps our expectations were too high. If so, we may justly blame the accounts the technical papers gave in advance, though we perhaps should blame ourselves for not realizing that the building is not devoted to electric light, but to electricity; and thus much space is occupied by exhibits of no great interest to electric light managers. This was perhaps a source of disappointment; but, we must admit, an avoidable one on our part. However, we were the most surprised and disappointed in the lack of new ideas and novel machines in the production and utilization of electricity; and our regrets on this score were but partially relieved by seeing some huge dynamos and engines on one bedplate, with the armature of the former acting as the fly-wheel for the latter, as these machines had long been common in Europe. We saw exhibits of a large number of dynamos all alike in part and size. They looked pretty; but, from an educational standpoint, *cui bono?* Why show twenty or thirty, or perhaps a hundred, machines all alike in workmanship and finish? In other words, why not occupy the space with a greater variety of appliances, and thus make the exhibit of the more educational value, instead of striving to impress the public with its magnitude? The nature of many of the exhibits gave the discerning onlooker the impression that the exhibitor had obtained more space than he really needed, and was trying to cover the ground. This was the more to be regretted as there are certainly many novelties and a number of uses to which electricity can be applied which are not fully shown in the building, or were not on view at the time of our visit. This certainly was a golden chance for the electrician to demonstrate how this subtle, imponderable power could be applied in the daily walks and vocations of life; to display its many strong points as an illuminator in the house where expense is of little account, and its capabilities for household decoration; and to exhibit this energy harnessed for use in the library, in the parlour, in the dining-room, in the kitchen, in the workshop, and in all the ins and outs of every-day life. This was the opportunity presented; and we do not feel that the occasion has been fully met. A grand scheme would have been to have fitted up a part of this building as a house, and devoted a part to industrial uses, and so have shown electricity employed practically in the daily problems of life. These remarks are not made with the desire to belittle this part of the show. We simply mean that much was promised, and, with the means at command, the exhibit ought to have been above criticism. We acknowledge the big ideas with which our electric friends have carried out their plans; and we admit that the word "big" fits in with the general exhibit. Still, we feel that, in aiming at vastness, novelty should not have been overlooked. As at the time of our visit, all the exhibits were not in place (though they should have been, as the Exhibition had been open many weeks), it is possible that a second inspection may show that the new and the novel are there as well as the massive. An extended description of each exhibit must therefore be deferred.

Let us, in closing these comments, impress on every reader that the Chicago Fair is, as stated at the outset, unlike anything the world has ever seen, or is likely to see for many years; and that everyone should visit it who can by any means do so. It will well repay a trip across the ocean.

TECHNICAL RECORD.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

Annual Meeting in Dundee.

The Thirty-second Annual Meeting of the North British Association of Gas Managers was held in the University College Buildings, Dundee, on Thursday last. Mr. T. Douglas Hall, of Montrose, occupied the chair; and he was supported on the platform by Mr. Adam MacPherson, of Kirkcaldy, Mr. R. Mitchell, of Edinburgh, Mr. J. M'Gilchrist, of Dumbarton, Mr. A. Yuill, of Alloa, Mr. R. B. Main, of Glasgow, &c. There was a larger attendance of members than has been seen at any of the meetings of the Association for a number of years. Among those present were Mr. Jesse Hall, of St. Andrews; Mr. A. Wilson, of the Dawsholm Gas-Works, Glasgow, Mr. John West, of Manchester; Mr. W. A. Valon, of Ramsgate; Mr. J. Hepworth, of Carlisle; and Mr. David Terrace, of Middlesbrough.

The President expressed the gratification of the Committee at seeing such a number of members present. Their programme, he said, was a very long one; and they should require all the time at their disposal to do it anything like justice. He trusted, therefore, that there would be no undue delay; and that the meeting would be an enjoyable one.

The Committee's Report.

The Secretary (Mr. R. S. Carlow, of Arbroath) read the report of the Committee, which, it was stated, was presented in the form agreed on at the 1885 meeting. It gave a general outline of the business done, with some notes that might be interesting. The Benevolent Fund in connection with the Association had been drawn upon largely during the past year —£45 having been paid to five deserving cases. The annual report of proceedings, 1892, was published, and sent to each member of the Association, according to the rules. It contained the President's address, papers and discussions thereon, a list of the Past-Presidents, new members admitted, names of members of Committee, rules, balance-sheets, &c., &c. The Statistical Report for the year ending the 31st of July, 1892, was compiled and bound together with the Annual Report of Proceedings for 1892, and issued to all members of the Association, as well as to those who gave the necessary information. The Committee had to report that in terms of motion made by Mr. James B. Terrace, of Brechin, application was made, on behalf of the Association, to the Royal Society, Burlington House, London, for a grant of £30 for aiding a fund for research purposes in connection with the manufacture and distribution of gas. They were, however, sorry to state that a communication had been received by the Secretary of the Society, stating that the Government Grant Commissioners, after considering the same, were not prepared to recommend that it be granted. The Committee had also to report that they visited the Peebles Gas-Works on Wednesday, May 17, for the purpose of inspecting and reporting on the process carried on there of manufacturing gas from oil. The Committee were met at the gas-works by Messrs. Young and Bell; and they were shown over the whole works, and inspected all the appliances and plant in connection with the making of gas from oil, as carried on at Peebles. They received from Mr. Young a full and detailed statement as to the working out, and the practical results obtained from this process of making gas from oil. Mr. Young and Mr. Bell, before the Committee left the gas-works, kindly agreed to read papers on their oil process of gas making at the present meeting; and the Committee therefore considered that a report from them, in the meantime, would to a certain extent forestall the papers to be read by Mr. Young and Mr. Bell. They, therefore, had considered it advisable to postpone giving any opinion upon the Peebles process of making gas from oil until after Mr. Young and Mr. Bell had read their papers; but those of the Committee who had the pleasure of seeing the process at work would be better able to join in the discussion which would no doubt take place on these papers.

Report of the Research Committee on "Coal Analysis."

In conformity with the motion proposed by Mr. M'Gilchrist at last year's meeting, on Mr. M'Crae's paper on the above subject—"That the Research Committee should be instructed to report on the subject to the next annual meeting," and which motion was unanimously agreed to, the Committee had to report that, bearing in mind the great importance of the subject, and also of the many questions involved, they had given a considerable amount of time to its consideration; and they had several meetings and consultations thereanent. It was their desire to exercise such caution as to ensure that their deliberations would meet with the general approval of their fellow-members of the Association. They felt, for one thing, that consideration of the subject had been too long delayed. They felt also that the absence of any reliable data as to the practical value of coals for gas-making purposes had been the cause of much anxiety and trouble to gas managers generally, as well as to their employers, whether as companies or corporations. Believing this to be the case, the Committee set themselves to

put forward to the gas world a few conditions which should guide all purchases of gas coals, and which, if faithfully acted up to, would do away with much of the dissatisfaction which had been so apparent in times gone by. The conditions might be considered by some as being insufficient either in number or in severity; but the Committee submitted that, as presented, they carried on their face, simple practical rules which should guide practical men—be they buyers or sellers, of the article under consideration, or indeed any other kind of merchandise. They were harsh to no one; and, if carefully considered by all, they should be accepted as being just, reasonable, and right. The conditions suggested by the Committee were as follows—

(1) The fallacy of depending on printed analyses as recently issued because, to obtain the practical value of any coal, from 20 to 40 per cent. must be deducted from such printed analysis.

(2) To condemn the recent custom of changing the name of any individual coal.

(3) To discard giving the coal any other name than that of the pit from which it was drawn: also the name of the colliery.

(4) That all analyses should be conducted on a thoroughly practical scale; and that the coal analyzed should be treated in precisely the same manner as such coal would be subjected to in gas-works.

(5) That every sample drawn for examination should be taken from a lot equal in weight to at least 5 tons; and further, before the sample was drawn, the whole 5 tons should be broken and thoroughly mixed, and from which mixture the sample ought then to be taken.

(6) To state on the face of the analyses whether or not an exhauster had been used, and the quantity of coal used for each test.

(7) That suitable burners be used to test the various qualities of gas for various analyses; and that the burner employed be described, and the pressure at which the gas was consumed.

(8) That a copy of this report should be sent to every coalmaster and coal merchant in Scotland who supplies gas-works with coal or cannel.

These were the conditions the Committee recommended; and they considered they spoke for themselves. But, at the same time, the Committee requested the hearty co-operation of the members in carrying the conditions into effect.

The PRESIDENT said the Committee, at their meeting that morning, had the report on "Coal Analyses," before them, and very carefully considered it; and he thought the members would be quite safe in adopting it.

The report was adopted without remark.

NEW MEMBERS.

The SECRETARY submitted the names of the following gentlemen for election to membership:

ORDINARY MEMBERS.

Bowman, J.	Gas-Works	Huntley.
Cay, J.	,,	Keith.
Ewing, W.	,,	Hamilton.
Fox, W.	,,	Lerwick.
Guthrie, J.	,,	Lochgelly.
Hislop, L.	,,	Uddingston.
Marr, W.	,,	Stonehouse.
Marshall, W.	,,	Banff.
Munro, J.	,,	Crail.
Myers, N. J.	,,	Saltcoats.
MacPherson, J.	,,	Cupar, Fife.
M'Alpine, A.	,,	Troon.
M'George, W.	,,	Comrie.
M'Lusby, W. B.	,,	Kirkcudbright.
M'Pherson, J.	,,	Beith.
Peacock, T.	,,	Carluke.
Pooley, H.	,,	Dunfermline.
Renfrew, J.	,,	Mid Calder.
Robb, J.	,,	Kirkwall.
Robertson, A.	,,	Alyth.
Scott, A.	,,	Laurencekirk.
Smith, W.	,,	Melrose.
Stevenson, A.	,,	Skelmorlie.
Thomson, R. B. H.	,,	Broughty Ferry.
Turner, T.	,,	Airdrie.
Waddell, F.	,,	Blairgowrie.
Whyte, W.	,,	Penicuik.

EXTRAORDINARY MEMBERS.

Gillespie, A.	Gas Engineer	Glasgow.
Little, G.	,, ,,	London and Aberdeen.
Russell, A.	Colliery Agent	Glasgow.
Slight, J.	,, ,,	Glasgow.

ASSOCIATES.

Anderson, E. E.	Gas-Works	Old Kilpatrick.
Dewar, J.	,,	Paisley.
Sharp, R.	,,	Belfast.

The membership showed an increase of 17—from 222 to 239—and is made up of 160 ordinary members; 59 extraordinary members; 14 associates; and 6 honorary members.

THE MURDOCH MEMOKIAL FUND.

Mr. J. M'GILCHRIST (Dumbarton) reported that the Murdoch Memorial Fund consisted of a deposit receipt for £200, and a current account for £2 9s. 9d. The expenses connected with the unveiling of the bust of Murdoch at Stirling had been met; and, after all of them had been paid, there was the above sum to the good. It had been suggested that in the current year an attempt should be made to raise £300—making the sum £500—so as to found a bursary in connection with the name of Murdoch. He hoped that this time next year would see this an accomplished fact.

On the suggestion of the President, Mr. M'Gilchrist was re-elected Secretary and Treasurer of the Memorial Fund; Mr. M'Crae and Mr. MacPherson being appointed a Committee to act with him.

THE AUDITOR'S REPORT.

Mr. R. B. MAIN (Glasgow) then submitted the balance-sheet of the Association, which showed a total income of £192 17s. 10d., of which £65 12s. was derived from annual subscriptions; and that there was a sum due to the Treasurer of £22 10s. 8d. The Benevolent Fund showed annual subscriptions amounting to £25 16s.; a total amount of £272 15s. 8d.; an expenditure of £45 in grants; and other expenditure amounting to £11 5s. 4d. The Research Fund showed annual subscriptions amounting to £7 10s.; and a total amount (including £70 upon deposit receipt) of £90 6s. 11d. The expenditure was £16 8s. 5d.

The PRESIDENT said that, at first sight, the balance-sheet might not look a promising one; but, on close inspection into the figures, he thought it was very creditable. He believed, at all events, that Mr. Carlow saw his way to have the balance on the right side next year.

The balance-sheet was adopted; and Mr. Main was accorded a vote of thanks for his services.

THE PRESIDENT'S ADDRESS.

The PRESIDENT then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—In opening the proceedings of the thirty-second annual meeting of the North British Association of Gas Managers, my first duty is to thank you for the honour you conferred upon me in electing me as your President for this year; and I trust, now that my duties are nearing their most important crisis, I shall be able to bring my year of office to a successful termination. Let me here express a hope that the work has been carried out in such a manner as to maintain the good position of the Association. Apart from the personal honour, I consider my selection as a compliment to managers of medium-sized gas-works.

Managers of small works have their troubles, their anxieties, and their successes, just the same as those who control large works; and I speak from experience when I say that it requires quite as much care to manufacture 10 million cubic feet of gas per annum, as it does to make 200 millions. The same care and skill are required to navigate a ship of 50 tons burden across the ocean as to manage one of our huge Atlantic greyhounds.

Although much of the success of such a gathering as the present must necessarily depend on the President, yet each of us has it in his power to contribute something towards success, by taking part in the discussions and favouring his fellows with the benefit of his experience. Particularly would I ask the younger members, upon whom eventually must devolve the work of this Association, to manifest a keen and lively interest in our proceedings to-day.

At the outset, let me refer to the sad and severe loss the Association has sustained this year in the death of four of its members—members who not only had the interest of the Association at heart, but who took an active part in its practical work. Mr. John Somerville, Engineer of the Bankside station of the South Metropolitan Gas Company, passed away after a few hours' illness, on the 15th of December, 1892. In him we lost one of the best known, most popular, and ablest of leaders in the gas world. Mr. William Mackenzie was a gentleman who had only to be known to be respected. He died on the 11th of April last; and he was one of our oldest members. If not the originator of this Association, Mr. Mackenzie was one of the first to join its ranks. He was appointed Secretary at the first meeting of the Association, held in Cupar in 1862—he being at that time Manager in Cupar—and he faithfully served the Association in that capacity for 21 years. Under his presidency, a most successful meeting was held in Edinburgh in 1882; and at the meeting at Perth in 1890, we saw and heard the last of him. Mr. Mackenzie endeared himself to us all by his quiet, courteous manner, and his zeal for the welfare of the Association. The circumstances attending the death of our friend are particularly sad, seeing that only a few weeks previously he had intimated his resignation, and was looking forward to a well-earned rest. Mr. Laurence Hislop is the third gentleman to whose death reference should be made. He was one of the Vice-Presidents of this Association, and was a constant attendant at our meetings. He was a Member of Committee for many years, and took a deep interest in the business of the Association. It is a strange coincidence that he passed away on the same day as Mr. Mackenzie, and that on the day of our last Informal Meeting the announcement of both deaths appeared in the morning papers. Yet another loss falls to be chronicled by me—the death of Mr. John Head on Friday, July 14. Mr. Head was an extra-ordinary member of the Association, and not a stranger to us. He was present at our 1885 meeting in this building, and took part in a discussion on regenerative furnaces—a system of which he was a known and able exponent; and his long connection with the Siemens firm secured for him a wide acquaintance among gas engineers. At the time of his death, Mr. Head was Manager to Mr. Frederick Siemens in London. The Secretary had a letter from him so recently as the 7th of July,

One or two of our oldest members have during the past year retired from active service as gas managers; and while they still retain their connection with us, it is a question for consideration whether the Association should not confer some honour upon them. It is pleasant to note that the Boards those men had so long and faithfully served have done something to make the evening of life somewhat easy for them.

It is now eight years since the Association met in this prosperous city; and no doubt we all have pleasant recollections of that successful and enjoyable meeting, and of the able way in which our esteemed friend Mr. John M'Crae conducted the proceedings. The statistics relating to the gas supply of a city like this sufficiently gauge its prosperity or otherwise now. In the year 1869 (24 years ago), when the Dundee Commissioners acquired the gas-works, the annual make of gas was about 200 million cubic feet, and the price was 5s. 4d. per 1000 cubic feet. In 1885 (eight years ago), when we last met here, the make of gas had increased to 400 million cubic feet; and the price had been reduced to 3s. 6d. per 1000 cubic feet. This year, 502 million cubic feet have been manufactured; and the price has been reduced to 3s. 2d.—the lowest price that gas has ever been sold at in Dundee. The revenue and expenditure of the Gas Commissioners are the largest of any public board in the city. From £39,000 in 1869, it has risen in the past year to £100,000. Not only does Dundee possess modern and efficiently equipped gas-works, but a complete and beautifully equipped electric light station, the property and under the control of the Gas Commissioners. With their usual kindness and liberality, the Commissioners have invited the members of this Association to inspect both these works; and I am confident that, as the result of our visit, the only conclusion we can arrive at will be that in respect of artificial lighting Dundee is second to no other city. It reflects credit on the Commissioners that they offer to supply the ratepayers with either gas or electricity. Here we have clear proof that there is no spirit of antagonism between the suppliers of these two sources of light.

At present the electric light installation is capable of supplying 6000 lamps of 16-candle power; and it can be extended so as to supply 25,000 lamps of the same power. About £30,000 has been expended on the station. I do not mean to condemn, nor do I mean to justify, public Boards spending such large sums of money "on that which is not bread." Electricity has not yet proved itself to be anything more than a luxury; and gas has become a necessity. This, however, is an age of progress; the great Niagara Fall itself, with nine million horse power, is becoming "a slave to the lamp" electric. It is to be hoped the Dundee Gas Commissioners in their wisdom will make the electric light department stand on its own legs. As in the case of gas, those who use electricity should be required to pay for it.

I cannot close these notes on the city we meet in without reference to the water supply. It is one of the finest in Scotland. Through the kindness of the Water Commissioners, who have placed their beautiful properties both at Lintrathen and Monikie at our disposal, we are to-morrow, with our lady friends, to be privileged to view the lovely grounds of Monikie, the source of an unlimited supply of sparkling water.

Passing from these local to more general subjects, I will not dilate on the difficulty of preparing a presidential address. But I may say that no less than nine presidential addresses have been reported in our technical journals within the past six months; and these have touched every question of interest in gas manufacture. It is impossible for me, therefore, to introduce any fresh feature or fact to you to-day. Federation of Gas Managers' Associations alone can cure this state of things; and no doubt future presidents will be truly thankful if only one address per annum has to be reported, and possibly the readers of our journals will not be sorry.

Seeing we have so many interesting papers on the agenda, I shall only point you to a few matters that in my opinion are worthy of consideration and study. It has been repeatedly said, but unjustly I think, that the ways and means of producing gas from coal have not been so progressive as those of other industries. Ever since Murdoch sat ruminating at his fireside in Cross Street, Redruth, and saw the jet of pale brown smoke issuing from the glowing coal, and conceived the idea of converting his "churchwarden" into a gas-retort by applying heat to it, coal has been destructively distilled by heat. Murdoch's first retort was a "clay pipe;" our retort of to-day is also a clay pipe. The same may be said of steam. Since Watt observed the puff of vapour issuing from his mother's kettle till now, steam has been generated from water by heat. Those of us who had the privilege of seeing the magnificent range of gaseous-fired boilers at the Govan Iron-Works some years ago, must admit that progress has been made in the ways and means of producing steam; and the same may be said of coal gas. If we look round one of our modern retort-houses, we shall see tier upon tier of retorts. But where are the furnaces we were so familiar with? These furnaces, we know, have given place to the regenerator underneath the charging-floor; leaving clear space for other operations. I would, in this connection, direct attention to the retort-houses at the Dawsholm and Temple Farm works of the Glasgow Corporation, with their 1350 retorts and hydraulic drawing machines, as well as the arrangement at the Aberdeen Corporation Gas-Works, so ably described by Mr. West some years ago, with its endless-rope movement, power charging and drawing machines, and powerful coal-breakers; and, lastly, I would call your attention to the new retort-house at Middlesbrough, so recently described by our friend Mr. Terrace, its designer. Truly these are new departures in retort-houses. In no section of a gas-works is there more sign of change at the present time than in the retort-house. Possibly, were we to return to this sublunary sphere in the course of another century, we should no more recognize the retort-house of the future than would Murdoch recognize that of the present day.

As stokers give way to manual machines, so the latter in their turn give place to hydraulic, steam, and power charging and drawing machines. They again appear as if they were to be supplanted by inclined retorts. It may also be that these will give place to revolving retorts, rotary machines, or web retorts, which, when perfected and proved, may produce for us a continuous process of coal carbonization in practically closed vessels.

It is needless for me to refer in detail to the methods now in vogue for removing all traces of ammonia from the gas, or to the different processes of purification. But I may say that purification in closed vessels—the dream of gas managers—is now nearly accomplished; and the days of "blue billy" in any form must surely be consigned to the limbo of the past.

Gasholder construction has grown with the growth of the industry. We have holders now of six lifts, 180 feet high, and containing 12 million cubic feet of gas. For 60 feet, the one to which I refer stands clear above the guide-framing. That is the famous East Greenwich gasholder, erected for the South Metropolitan Gas Company, London, which is the largest holder in the world. Notwithstanding its immense proportions, it was erected and completed within twelve months; and it now stands, after about a year's working, one of the triumphs of gas engineering. Another large holder will soon form a conspicuous object in the landscape near Glasgow, at the Temple Farm works, Maryhill. This holder we were privileged to inspect a few months ago. Its guide-framing and lattice-work reaches to a height of 138 feet; and when full it has a capacity of 6 million cubic feet. When we compare these huge structures with those of fifty years ago—cooped up in massive buildings of stone, in case they should burst and scatter death and destruction all around—we can honestly affirm that we have progressed. The question suggests itself: Shall we stop at a 12 million cubic feet gasholder? Before leaving this topic, I would refer to a novel and ingenious method of regulating the pressure, which has been applied by Mr. A. Smith, of Aberdeen, to a holder some distance from his works. It was necessary to fill this holder during the day from the street mains, without giving undue pressure, and also to maintain the necessary pressure at night. He accomplished this object by means of an annular water balance-tank. Water is pumped into this tank, and the pressure given by the holder is reduced to about an inch. On the tank being emptied, 3 inches of pressure can be had if required. The arrangement is said to work well; and I think that it reflects much credit on its designer.

With respect to condensation, we know that temperature is of the greatest importance in all chemical actions. At low temperature, action ceases altogether. Owing to the irregularities in the quantity of gas manufactured, and to our variable climate, it is a difficult matter to obtain condensation without taking extra precautions. These I would try to point out to you, more especially as applied to small gas-works. Too rapid condensation of coal gas causes loss both in quantity and quality. It is therefore not only desirable, but necessary, that we should have our condensing apparatus thoroughly under control. If the temperature of the gas be too low, we remove the illuminating constituents; and if it be too high, we retard the action of the scrubbers. Accordingly, it is necessary that we should carefully and constantly note the temperature of the gas, both at the inlet and the outlet of the condensers; and, if possible, secure a temperature of not less than 50° at the inlet. All condensing apparatus should be protected from the influence of intense cold or excessive heat; yet how rarely do we find this state of things? Again, the apparatus should be capable of being regulated or bye-passed. In many works there are no means of doing this. In such a case, I would suggest that the liquor should be run off, and the gas allowed to pass clear through; for, as a rule, the condensing plant in small and medium sized works is too large, especially during winter, and even when the make of gas is what we might call large, the volume is too small to retain the temperature above that of the atmosphere, which at times remains for weeks under freezing-point, and occasionally we have such temperatures as 15° to 20° Fahr. The result of reducing the temperature of the gas to these points may be imagined. Not only is there a loss of illuminating power, but the purifiers are sometimes completely disarranged. In my own case, I have a good-sized and lengthy foul main, and am able during severe weather to bye-pass my condensers. I would advise managers of small works to increase the length of the foul main. The condensers, as a rule, are large enough, and we rarely hear of an extension of plant at this point, provided the foul main is long enough. If no means of bye-passing exist, then unseal. Something may be accomplished by running off the liquor. If this cannot be done, cover up the condenser well with an old sail. Covering the purifiers in winter greatly aids the actions and reactions that go on in

the apparatus. I would certainly say that all purifiers should be under cover; and, if possible, the condensers also.

A very few statistics will suffice to show the magnitude of the industry we represent—an industry with an unbroken record of over a hundred years, and one that to-day shows more vitality than ever it did, in spite of all opposition from rival sources of light. The estimated capital employed in gas manufacture in this country has reached the large sum of £65,000,000. The quantity of gas sold in London amounts to 30,000 million cubic feet; and the consumption of gas in the United Kingdom during 1892 reached the high figure of 100,000 million cubic feet—showing an increase of 50 per cent. during the past ten years. The coal used in this country for gas alone amounts to about 13 million tons. These figures only give a vague idea of the true magnitude of our industry, and they do not lead to the conclusion that it has reached its highest point.

The next matter with which I propose to deal relates to the raw material we employ. Not many years ago, this would have been expressed by the word "cannel" or "coal." Not so to-day. Oil now plays an important part in the manufacture of gas. The extent to which it is so employed may be gathered from the fact that in six months the South Metropolitan Gas Company used 154,000 gallons of oil, representing 77,000 tons of cannel coal; and The Gaslight and Coke Company used 74,000 gallons, equal to 37,000 tons of cannel coal. The use of oil was the result of the exorbitant price which coalmasters asked for first-class cannel. The only reasonable excuse for such a high price being charged was that foreign and Continental gas companies were glad to get cannel at any price. I should like here to express an opinion, and one that I saw advocated in a public print not long ago, that we should impose a tax on exported coal. Seeing that coal is not "made in Germany," I think we could in all fairness do so. Various opinions have been expressed as to the resources and probable duration of the British coal-fields; and a time has been pointed to when these shall be exhausted. Be this period when it may, one thing is certain, that the increasing export of coal from this country will not stave off the evil day. When foreign nations compete with Britain in articles of manufacture, they ought to be compelled to pay for the material which enables them not only to do so, but to undersell us in our own markets. Probably this opinion may find its way to the Chancellor of the Exchequer, and induce him to relieve the British taxpayer of some of his burdens. Some of you may have read a description of a block of coal that has been hewn out of a pit in Wigan, and sent to the World's Fair at Chicago. This block of cannel coal weighs upwards of 12 tons. It took nine months to hew it; and it cost £83 per ton. Then it was boxed up and sent by train to Liverpool for shipment; and it is not unlikely that this "black diamond," when it reaches its destination, will have cost more than £100 per ton.

Last year, Mr. Mackay, of Peterhead, introduced to our notice the subject of enriching coal gas by paraffin oil or liquid hydrocarbons; and since then the question of making gas from oil has developed to a large extent. A process has been patented which removes any doubt that oil can be converted into a permanent gas, used as an enricher of ordinary gas, and thus form a mixture equal in every way to the gas obtained from the best cannel coal. I refer, of course, to the patent process of Messrs. Young and Bell, generally known as the "Peebles process." Much has been said and written about this process during the past six months; and many exhaustive reports have appeared in our technical journals, all of which, no doubt, most of you have read, more especially those of Mr. Mitchell and Mr. Linton, for the Edinburgh Gas Commissioners. As we are to have papers on the subject from both the authors of the Peebles process to-day, it would be presumption on my part to say much about the subject. However, as President of this Association, and one of the deputation from the Research Committee who visited the Peebles works and saw the process in operation, I feel that it is a duty devolving upon me to express my opinion. While Mr. Mackay deserves every credit for introducing the question of the enrichment of gas by oil, there does not exist in my mind any doubt whatever that, if oil is to be used as an enricher, then the Peebles process is the one we should adopt. It is so simple, so scientific, that to see it is to stamp it with the hall-mark of a very practical and workable plant. No doubt the spraying and cracking up of the oil being operated upon in ordinary retorts by compression was a step in advance, and may be yet further developed; but, in my opinion, no amount of compressing, spraying, or cracking up can secure such results as have been obtained at Peebles by the *persistent* distillation of the oil in separate retorts, whereby all the oil is converted into permanent gas, and only free carbon, in the form of a rich coke and powerful heating agent, is left behind. This coke is almost pure carbon, and when burned leaves almost no ash. What could be more natural than to keep the oil vapour, as it leaves the retort, in contact with the oil as long as possible during the process, and then wash with the oil itself? This is just what we do with coal gas—condensing it in presence of its own oils and tars, and washing it in its own ammoniacal liquor. That Messrs. Young and Bell have made a great discovery, there can be no doubt. As someone naturally must be first, Mr. Scott, of Galashiels, has the honour of first trying this process on anything like a large scale. He has set twelve retorts, at a cost of £1100, to be used for oil distillation. These retorts, I understand, are heated by the spent heat from the ordinary coal retorts. I may say that the temperature required to gasify the oil is about 900° Fahr. I do not intend to describe the Peebles system; but I may say that the process of enriching must resolve itself into one of price. Already, as we all know, cannel coal can be bought at something like a reasonable figure; and every manager must consider for himself whether it is cheaper to use oil or cannel. There is a fascination about the oil process that will go a long way to ensure its adoption. Simply turn on an oil-tap, and the manufacture of gas commences and goes on. It is only necessary to remove the coke once a day.

As I have said, in every department of gas manufacture progress can be noted; and the meter department is no exception. Mr. Keillor is to bring under our notice to-day the prepayment meter, which in my opinion is to be a boon, not only to gas consumers, but to gas companies. We are all accustomed to the automatic supply system seen at our railway stations; and I think everyone must admit that to supply gas in this way is rather a startling announcement. That this meter is no toy, but a thorough practical piece of mechanism, may be gathered from the fact that in Liverpool alone nearly ten thousand of them are in use; and so popular are they with small cottage consumers, that gas companies have difficulty in supplying the demand. I have no doubt that Mr. Keillor, with his usual ability, will make out a good case for the prepayment meter. If any proof should be required of the growing popularity of the dry meter, the following figures should suffice: In the year 1862, 37,605 meters were tested in Edinburgh; of these 35,923 were wet and 1682 dry. In 1892, 38,608 meters were tested; of these 16,709 were wet and 21,899 dry. This needs no comment.

Mr. Ballantyne is to introduce the important subject of "Cooking by Gas." At no time in the history of gas lighting has the question of heating, cooking, and motive power by gas been brought so prominently before the public notice. Gas suppliers find now-a-days that means must be taken to push the sale of their commodity; and it is only by giving personal attention and advice to consumers who use these appliances that we secure success. In the first place, the supply of gas must be ample for the cooker or fire. Companies and corporations are seeing and recognizing the necessity of hiring out cookers at reasonable rates. Notwithstanding all this, in many towns the consumers are slow to adopt anything new; but once let them adopt cooking by gas, and by a little care and study master the simple manipulation of a gas cooker, and they rarely return to the primitive and wasteful common coal-fire. Anything we can do to increase the day consumption should have our double attention—seeing that the same plant is being made to do double service, and consequently the profit is increased. During the past ten years gas-engines have developed to a great degree; the engine itself has been perfected, not only for small motors but for sizes ranging up to 100-horse power. It has again and again been demonstrated that, to utilize to its fullest extent every atom of power in a pound of coal, the coal has to be gasified and the gas used to develop that power. And this is the sheet-anchor of gas managers.

The Yeadon retort, which Mr. D. M. Nelson is to describe to us to-day, is the latest invention, having for its aim the automatic carbonization of coal. There are so many novel features presented to us in this invention, that at a first glance we are tempted to treat it as a toy. But those of you who, like myself, have carefully read the description of the invention given in our technical journals, also in the paper read by Mr. Terrace, of Middlesbrough, at the North of England meeting, and the discussion that followed the reading of the paper, cannot fail to see, if they read between the lines, that all those who had seen the rotary retort actually at work were impressed with the idea that great things may be expected from this machine in the near future. We have a revolving tapered retort. The coal is treated in small quantities at a time, and is so thoroughly carbonized that surprising results are obtained. Fifteen thousand cubic feet of gas from a ton of small coal, and no coke—which in many gas-works is a great consideration—is something to think about. The small space this retort occupies, and the quantity of gas it is capable of producing in a year—about 30 million cubic feet—seems at first sight rather fabulous; and the probability of being able to supply a town of the size of the one I represent with one retort is rather astounding.

Among the subjects which have recently engaged the attention of gas engineers, automatic appliances to handle the coal and coke have held a prominent place; and complete self-acting plants are now in operation at a number of gas-works. At our meeting in Perth in 1890, we led the van by bringing this matter to the front with a paper by Mr. Gilbert Little, of the New Conveyor Company, of London and Aberdeen; and we are to have a paper to-day, from the same gentleman, on "Automatic Appliances for Small Works." Mr. Little's well-known picture of "An Automatic Gas-Works" adorns the wall of a large number of gas managers' offices; and the desire of a great many of us, as we look at that picture, is that the beautiful automatic scene depicted was a reality in our works. Complete automatic retort-houses are a reality at a number of large and medium-sized works; and Mr. Little will no doubt detail how similar self-acting plant can be arranged for small works. The idea of complete automatic gas-works has "caught on;" and as the appliances are now obtainable, we may confidently

expect to see self-acting retort-houses the rule and not the exception.

I feel, gentlemen, that I have already taken up too much of the valuable time of this meeting; but this address would be incomplete did I not make some reference to our friendly rival electricity. That great developments in this system of lighting have taken place during the past fifteen years must be admitted; and that still greater developments will take place before another fifteen years pass over our heads may be reasonably anticipated. It is 90 years since Davy first produced the electric light by the use of carbon points; but it was not till 1887 that it was first used as a means of light in many public buildings in London. Now, in 1893, there is hardly a town in any country that does not possess an electric installation. It is a singular fact that in no town where electric lighting has been introduced has the consumption of gas decreased. I would note the case of Eastbourne, as a striking example of this. Eleven years ago the electric light was introduced in that town; and since then the make of gas has increased cent. per cent. In my own town, there has been an increase in the face of three electric light installations; and I feel quite safe in predicting the same for Dundee.

I am sure that electricians owe a debt of gratitude to Mr. Denny Lane, for pointing out a means of overcoming the two greatest difficulties in the way, which prevent the electric light making such headway as it otherwise would; and at the same time gas companies must acknowledge their indebtedness to him for endorsing what we for some time have looked upon as a means of making an amicable union between gas and electricity. These two great difficulties, as he (Mr. Lane) points out, are, first, the cost and loss entailed in conducting the electric current from the station where it is generated to the consumer; and, secondly, the inability to store electricity. These difficulties are to be overcome by gas, converted into power by gas-engines, driving dynamos which produce electric current. In Dundee there is a private installation of electricity of over a hundred lights, the dynamo being driven by a gas-engine. The proprietors say that good results, both as regards efficiency and economy, are obtained; and they claim that the cost of the light is much less than that supplied by the Commissioners—viz., 3¼d. per Board of Trade unit, as against 5d. which is the Commissioners' price. A private installation of sixty 16-candle lights has just been introduced at Montrose. The dynamo in this case is also driven by a 7-horse power gas-engine, and the light is really at times very pretty; but, like a bad supply of gas, it is very unsteady occasionally, and frequently disappears altogether, so that gas is being laid on in order to light up the premises when the electric current refuses to be tempted along the wires. The novelty of the light carries it a long way. It is still a luxury; and as gas managers, we may have less fear to-day of its ever superseding gas than we had five years ago. If corporations in lighting their streets would spend two-thirds of the money they devote to electricity on gas, the former illuminant would not be in the running. Electricity has been called the poor man's friend; but this must be a joke. In every installation the expense seems the greatest difficulty, both with the suppliers and the users of the light.

Water power has been suggested as a means of economy; but the power of water is often over-estimated. As an example, a large track of ground at Montrose called the "Basin," about eight miles round, is at each tide covered by water; and consequently the current of the flowing and receding tide through the bridge is very great. The City Fathers have had the idea of using this power for lighting the town. Only a few weeks ago a specialist was called in to feel the pulse of this mighty force; but, alas! it was found too weak to be of any use, and gas-engines were pointed to as the most economical means of producing the coveted current. The same mistake, we are told, was made in estimating the swift current through the London bridges.

I cannot do better than close this address by quoting the words of a former President, uttered fifteen years ago on this subject. After all these years, they are equally applicable to-day. He said: "We have heard of late much about electric light, and many fears have been expressed as to the probability of its superseding the use of gas; and I believe it has been the means of checking the anxiety of corporations to possess the mines of wealth supposed to belong to gas companies. Certainly science has done much of late for this new means of lighting; but it yet has much to do ere we will see the electric lamps at our hearths. By developing the use of gas for heating and cooking, our concerns will still be as successful and profitable, if not more so. It will take many years to weaken the hold gas has got as a necessity of life at the present day."

And now, gentlemen, I have finished. I have to thank you for the patient hearing you have given me; and to apologize for taking up so much of your time.

Mr. A. MacPherson (Kirkcaldy) proposed a vote of thanks to the President for his most instructive address. The President had, he said, gone over a wide field, and touched on a great variety of points; and he was sure that, on studying the address at their leisure, they would profit very much by it. He would also express the hope that Mr. Hall would kindly consent to his address being published along with the proceedings of the Association.

Mr. A. Yuill (Alloa) seconded; and, the proposal having been agreed to, the President gave his consent to the publication of his address.

The Reading of Papers.

The reading of papers was then proceeded with, in the following order:—

"Notes on Prepayment Meters," by Mr. George Keillor, of Nairn.

"The Principles of the Production of Illuminating Gas from Liquid Hydrocarbons," by Mr. Wm. Young, of Priorsford, Peebles.

"The Production of Illuminating Gas from Liquid Hydrocarbons by the Peebles Process," by Mr. Alex. Bell, jun., of Peebles.

"The Yeadon Process of Gas Manufacture," by Mr. D. M. Nelson, of Glasgow.

"Cooking by Gas," by Mr. John Ballantyne, of Rothesay.

A paper by Mr. Gilbert Little, of London and Aberdeen, on "Automatic Appliances for Small Works," was (on account of the lateness of the hour) held as read.

The papers, with the report of the discussions thereon, will be given in subsequent issues of the Journal.

Election of Office-Bearers.

The President intimated that the scrutiny of the voting-papers had resulted in the election of the following as office-bearers:—

President.—J. M'Gilchrist, Dumbarton.

Vice-Presidents.—A. Wilson, Dawsholm, Glasgow; A. Yuill, Alloa.

Secretary and Treasurer.—Robert S. Carlow, Arbroath.

Members of Committee.—A. MacPherson, Kirkcaldy; John M'Crae, Dundee; and A. Bell, sen., Dalkeith.

Auditor.—R. B. Main, Glasgow.

Mr. M'Gilchrist returned thanks for his appointment to the office of President.

Place of Next Meeting.

Next year's meeting was fixed to be held in Glasgow.

Visit to the Dundee Gas-Works.

During the interval, the members of the Association were driven to the Dundee Gas-Works, where Mr. J. Mitchell, the Convener of the Finance Committee of the Gas Commission, received them. Under the leadership of Mr. M'Crae, they walked through the works; paying particular attention to the new plant erected by Messrs. C. and W. Walker for the recovery of sulphate of ammonia, and the arrangement which Mr. M'Crae has fitted up for the firing of his steam-boilers with tar, and which was working very satisfactorily. The exhauster-room, containing four exhausters driven by steam, was admired as a model of neatness. The works do not contain any mechanical appliances for stoking; but general appreciation was expressed at their orderly arrangement and tidy appearance. It is evident that Mr. M'Crae is not a hard taskmaster, for a recreation ground was observed in a spare corner. The pretty flower-beds near the gateway also testified to his possessing an eye for the beautiful. After the inspection, luncheon was served in one of the store-rooms; after which the President, speaking in the name of the Association, thanked the Gas Commissioners for their kindness in affording the members the opportunity of seeing the magnificent gas-works of the Corporation, and also for their hospitality. Mr. Mitchell, in response, extended the welcome of the Commissioners to the members, and expressed the pleasure they had in entertaining the Association. He had, he said, the honour of proposing Mr. M'Crae when he was an applicant for the post of Engineer and Manager of the gas-works; and he was glad to say that his proposal was unanimously accepted. This was a step of which he was proud; for Mr. M'Crae had given the utmost satisfaction to the Commissioners in his management of the undertaking. The members then drove back to the University Buildings, and resumed the business.

The Question-Box.

There was only one paper in the question-box; and the President ruled that it was not necessary to answer it.

Votes of Thanks, Etc.

On the motion of the President, a vote of thanks was accorded to the readers of papers.

Mr. MacPherson then presented the medal of the Association to the President, which the President accepted and for which he returned thanks.

Mr. R. Mitchell (Edinburgh) proposed a vote of thanks to the Secretary, Mr. Carlow, who returned thanks.

The President proposed a vote of thanks to Princ pal Peterson, of the University College, for allowing the Association to meet in the building—a privilege which, he said, had never been accorded to any other body.

The meeting closed shortly after five o'clock; and the members and their friends thereafter dined together in the Queen's Hotel, nnder the presidency of Mr. Hall, and with Mr. M'Gilchrist and Mr. Yuill as croupiers. Lord Provost Matthewson and Mr. J. Mitchell, the Convener of the Finance Committee of the Dundee Gas Commissioners, were present.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week :—

Bills reported: St. Helens Corporation Bill; Leeds Corporation (Consolidation and Improvement) Bill.

Bills read the third time and passed: London County Council (Subways) Bill; West Hampshire Water Bill.

Bills Royal Assented: Accrington Gas and Water Bill; Barnoldswick Local Board Bill; Belfast Water Bill; Bilston Commissioners (Water) Bill; Bodmin Water Bill; Crystal Palace District Gas Bill; Electric Lighting Provisional Orders Bills (Nos. 5, 6, and 7); Frimley and Farnborough District Water Bill; Gas Orders Confirmation Bills; Greenock Corporation Bill; Liverpool Corporation Bill; Runcorn Commissioners Bill; Water Provisional Orders Bills (Nos. 2 and 3); Weaver Navigation Bill.

HOUSE OF COMMONS.

Tuesday, July 25.

LONDON COUNTY COUNCIL (GENERAL POWERS) BILL.

On the order for the consideration of the Lords' amendments to this Bill,

Mr. J. STUART moved that the House disagree with the amendment of the Lords to the preamble, with a view to restore the words which had been struck out, which would give representation to the County Council on the Thames Conservancy Board, and further representation on the Lea Conservancy Board.* He said the Bill, which had passed the House of Commons after an exhaustive inquiry, had been sent down from the Upper House in a form which he might justly describe as mutilated. The County Council did not ask for any unusual powers, but simply for what other towns possessed. They had a large and an unorganized population to deal with; and it was only natural that they should wish to have authority to inquire into all matters that might have an immediate bearing on the welfare of the population of London, and particularly on its water supply. They held, therefore, that they ought to have some voice in the management of the Thames and the Lea. The Thames Conservancy Board had the most far-reaching effect on the health, trade, and recreation of the 4¼ millions of people in the Metropolis. The Council did not approach the Conservancy in any hostile spirit. They freely recognized what they had done and endeavoured to do; but they wished to make the Board better able to fulfil their important functions. On the Lea Conservancy Board the Council had one representative; and his presence had had an advantageous effect on the management of the river. The present claim was not a new one on behalf of the representative body of London, for the Metropolitan Board of Works, shortly after it was formed, put forward a similar one; and in 1867 the Board of Trade backed it up in an important letter addressed to the Thames Conservancy. He hoped the House of Lords, when the Bill was sent back to them, would take some account of the wishes and the needs of the citizens of London, and would give way upon this very small modicum of self-government.

Sir F. DIXON-HARTLAND said he had not heard a single argument from the honourable member which should induce the House to disagree with the Lords' amendment. The only argument brought forward had been that the County Council wished to interfere with the Thames Conservancy Board. If this principle were established, where were they to stop? Was every undertaking inside the County of London to be interfered with by the Council? It was well known that the Thames Conservancy Board had always done their duty in a manner which had evoked the approval of all who were acquainted with the river. There was a Royal Commission now about to report on the water supply of London. Why not wait until they had reported? In the House of Lords, when Lord Hobhouse moved to reject the amendment which had been made in the Bill, the Government did not support the motion, Lord Morley, the Chairman of Committees, spoke against it; and it was withdrawn without a division. Lord Morley said the County Council ought to have representation on the Board; but he thought this ought not to be effected by Private but by Public Bill, as the constitution of that body had always been altered in this way. If the Council were to get four members now, who could say that this would be the extent of their demand? The Conservancy wished to have the Board properly balanced, because one interest was set against another. Supposing the London County Council should wish to buy up the undertakings of the Water Companies, if they had a majority on the Conservancy Board what was to prevent them from giving notice to the Companies that, by a particular day, they must stop the supply, or furnish it from another source, and so, when the value of the shares had fallen, buy up the property at a ruinous loss to the Companies? The Conservancy Board had no objection to the principle that the Council should be represented; what they did object to was that this should be done piecemeal and by Private Bill. The Board consisted of 23 members, of whom seven represented the City. But if the Corporation and the County Council amalgamated, and four members were now given to the latter, they would have eleven, which would be too large a proportion. Why should other counties concerned be entirely cut out from the representation? The representation of all the counties interested in the river could only be carried out by a comprehensive scheme which would give the London County Council their fair share; and to this the Conservancy had no objection.

Mr. BENN pointed out that, of the 23 members of the Board, 11 might be said to represent 2,000,000 people. But outside that representation there were 4,000,000; and if they wanted to destroy the balance of the Board, instead of asking for four members, they would ask for 22. It was now, he said, nearly a quarter of a century since any alteration was made in the constitution of the Thames Conservancy Board. During that time, London had advanced by leaps and bounds; and the proposal to have four members was ridiculously inadequate to the circumstances of the case. As to the objection that the promoters ought to have proceeded by a Public instead of by a Private Bill, he replied that the Thames Conservancy was founded by a Private Bill, and that several times since increased powers had been given to them by such Bills.

Mr. BOULNOIS contended that the London County Council should have promoted a separate Private Bill, if they wished to obtain representation on the Thames and Lea Conservancy Boards. He said the Council were an ambitious, not to say a covetous, body, who had yearnings after the City and its wealth, and wished to obtain the property of the Water Companies at the price of old iron.

Sir J. LUBBOCK urged that the people of London ought to have a voice in the management of the Thames; and he expressed the hope that the House would support the moderate proposal before it.

Sir G. RUSSELL said he spoke on behalf of those who were interested in the proper conservancy of the Upper Thames. He considered all interests ought to be fairly, adequately, and proportionately represented; and this could only be secured by a Public Committee taking evidence as to the relative claims of all bodies concerned.

Mr. GROVE supported the action of the House of Lords. He said the London County Council had very little soul and conscience; and if they once obtained representation on the Conservancy Boards, they would take good care to keep their neighbours off.

Mr. BONSOR claimed that Surrey should be represented on the Themes Conservancy Board as well as London. The fact was that there should be an inquiry into the whole matter; and every county along the Thames, and having an interest in the river, should be represented on the Commission.

Mr. ROWLANDS appealed to the House to stand by the decision of its Committee, which was unanimously arrived at.

Lord G. HAMILTON said that earlier in the session the President of the Local Government Board laid it down that the public law of the land could not be altered by a Private Bill. The present was an attempt to legislate in the interests of one local body to the detriment of other local bodies; and, in the circumstances, he thought the House of Lords had arrived at the right conclusion.

Mr. H. FOWLER reminded the House that the question was not one affecting the past history of the London County Council, or the manner in which that body had discharged their duties. Neither had the House to consider the aims and ambitions of the Council, or the disputes between them and other bodies. A Committee of the House had unanimously passed a clause in a Bill, by virtue of which power was given to the largest representative authority on the banks of the Thames—one which had by far the greatest interest in the conservancy of the river, and which represented besides the health of London—to have a small representation on the Thames Conservancy, who were the ruling authority on the river. The House of Lords had seen fit, however, to reject this clause; and the House had now to decide whether they would agree or disagree with the attitude thus taken up. The perpetual warfare which was being constantly waged against the London County Council, too frequently by members of that body, were never seen in any other municipality of the country. What was the history of this matter? In 1890 the question was raised by a Private Bill, which was fully discussed on the second reading, and was then referred to a Select Committee, presided over by Sir Joseph Bailey. The recommendation of the Committee was challenged by very much the same gentlemen who had challenged it that day; and the Chairman of Committees expressed the opinion that, as most of the drinking water of London was derived from the Thames and Lea, the body which had the right to look after the health of the Metropolis ought to be represented on the Thames Conservancy Board. The late President of the Board of Trade said most distinctly that he was in favour of the London County Council being represented on the Board; but he also submitted that the other bodies should be fully considered, that there ought to be an inquiry before the proposal contained in the Bill was adopted, and that a Committee should be appointed the following year to consider the whole question of the conservancy of the Thames. But no Committee was appointed; and now, three years later, when the Council asked for some representation, they were met with precisely the same arguments, which would have the effect of postponing the matter until the Greek Kalends. He thought the County Councils of Middlesex, Surrey, Kent, Essex, and Berkshire should be represented; and possibly other bodies in the upper reaches of the Thames might have some claim. How was the representation to be carried out? If the Lords' amendments were accepted, the whole question would be postponed for another year; and there was no reasonable prospect, in the present state of the public business of the House, that any Public Bill brought in by the London County Council could be carried through the House next year or during the next two or three sessions. He submitted to the House that they should accept his honourable friend's amendment, and disagree with the Lords' amendments. The Bill would then go back to the Lords; and there would be an opportunity of reconsidering the matter, and coming to a satisfactory conclusion this year.

Mr. STUART-WORTLEY said there would be very great practical difficulties in the way of the course proposed by the President of the Local Government Board (Mr. Fowler). The question was not whether the London County Council were entitled to representation, but whether that body ought to have an excessive and unduly preponderating representation. The House of Lords had done no more than the House of Commons did in 1890; and they were justified in their action by the extremely unfortunate attitude taken up towards the other riparian authorities by the Council, which had been treated on this occasion with great indulgence.

Sir A. ROLLIT and Colonel HUGHES expressed their disapproval of the Lords' amendments.

Captain BOWLES said the arguments used with respect to the Thames Conservancy would not apply to the Lea Conservancy; and he trusted the House would recognize that the cases were different.

Sir F. DIXON-HARTLAND said he understood that a distinct pledge had been given by the President of the Local Government Board, on behalf of the Government, to the effect that they would do their best

*See JOURNAL for June 20, p. 1160.

to introduce a clause in the House of Lords giving the London County Council representation on the Thames Conservancy Board by four members; and that an effort should be made at the same time to secure representation for other districts that were not represented at present. On this understanding, he would not put the House to the trouble of a division.

Mr. H. FOWLER said the Government could not give any pledge in reference to a Bill which was not their own; and he only made the suggestion referred to as between all the parties. He would do his best, of course, to carry out the arrangements; but he could not make any pledge for either the Government or the County Council.

After some further conversation, the motion to disagree with the Lords' amendments was carried without a division.

Sir J. LUBBOCK moved to disagree with the Lords' amendment in the preamble of the Bill, striking out words by which the County Council proposed to expend a certain sum of money on investigations and negotiations. The sum mentioned in the Bill was £10,000; and he said he intended to propose that the amount should be reduced to £1000. He believed this would meet with general assent. The expenditure of a small sum of money for obtaining information might possibly lead to a large saving; and, as the matter was not of a contentious character, he hoped the motion would be generally accepted.

Motions to disagree with other amendments having been carried,

Sir J. LUBBOCK moved an amendment to clause 15, the object of which was that the Council should not be authorized to spend more than a certain sum in one year on investigations and negotiations, "unless with the consent of the Treasury."

Mr. H. FOWLER moved to amend this amendment by striking out the word "Treasury," and inserting "Local Government Board," on the ground that the Treasury had no machinery or inspectors for dealing with questions of this kind, and that the Local Government Board was the proper body to deal with them.

Sir J. LUBBOCK urged that the London County Council were under the Treasury in all other matters, and had always acted smoothly with it.

The amendment, as amended, was agreed to.

The amount to be expended in any one financial year on investigations and negotiations was, on the motion of Sir J. LUBBOCK, limited to £1000, unless with the consent of the Local Government Board.

A Committee was then appointed to draw up reasons to assign to the Lords for disagreeing with certain amendments made by them in the Bill; and subsequently their report was brought up and agreed to.

The following progress was made with Bills last week:—

Bill reported, with amendments: Burghs Gas Supply (Scotland) Act, 1876, Amendment Bill.

Bill read the third time and passed: Burghs Gas Supply (Scotland) Act, 1876, Amendment Bill.

Cleveland Water Company.—The report of the Directors of this Company for the past half year shows a balance of £2747, allowing a dividend at the rate of 6 per cent. per annum on the original and "A" shares, and £4 4s. per cent. per annum on the "B" shares, free of income-tax. This, with the addition of £125 to the contingent fund, will absorb £2081, and leave a balance of £393 to be carried to the credit of next half-year's account.

New Water-Works for Denby.—The new water-works, which were commenced in May, 1892, by the Denby Local Board, were completed a few weeks since, and were formally inaugurated last Wednesday week. The supply of water is obtained from springs, situated on private ground, and is sold to the Board at the rate of 3d. per 1000 gallons. The storeage reservoir has a capacity of 2 million gallons; and the service reservoir will contain 100,000 gallons. The total cost of the scheme has been £5500; and the population provided for is 1750. Messrs. Crowther, of Huddersfield, were the Engineers.

The Proposed Amalgamation of Water-Gas Undertakings.—A special meeting of the North British Water-Gas Syndicate, was held in Glasgow last Tuesday, to confirm the resolution passed at the last meeting in favour of amalgamation with the Yorkshire and Lancashire Water-Gas Company, and the British Water-Gas Syndicate (see *ante*, p. 36). The Chairman (Mr. J. Reid Stewart), in moving the confirmation of the resolution, said that since the last meeting a misleading circular had been issued by Mr. Allan, the agent for the dissentient shareholders. In that circular a great deal had been made by Mr. Allan of Sir Horace Davey's opinion, while the shareholders had never been informed what the documents were that were put before him. The Directors were convinced that, if Sir Horace Davey had had a plain narrative of the facts with documentary evidence, he would have given a similar opinion to that of the Lord-Advocate, who was in favour of the amalgamation scheme. He expressed regret that the dissentient shareholders should be so unfortunately advised as to go on with litigation. The Directors of the Syndicate had instructed Counsel to move that Mr. Allan's action, or that taken by his London agents, should be dismissed as having been placed in the name of the North British Syndicate without any authority. Mr. J. Scott seconded the motion. Mr. Allan moved an amendment to the effect that the motion be not approved; but, after considerable discussion, it having been shown that he had not paid the last call on his shares, it was agreed that, by the Articles of Association, Mr. Allan was not qualified to move the amendment. Mr. Allan then said he would make his remarks take the form of a protest. It had been stated that the shareholders had not been informed what documents were put before Sir Horace Davey. He would mention that their Committee had seen the information; and Sir Horace Davey had given his opinion with the whole of the agreements of the Company before him, and a complete knowledge of the results of the working—or rather, he would say, failure in working—of water gas up till now. Mr. Cairney inquired how much of the call had been paid by the shareholders up to date; and it was intimated that 175 shareholders had paid £3797. The resolution was carried. On the same day, a meeting of the Yorkshire and Lancashire Water-Gas Company was held, at which the resolution passed at the previous meeting was also confirmed.

MISCELLANEOUS NEWS.

BRENTFORD GAS COMPANY.

The Half-Yearly Report and Accounts.

The report which the Directors of the above Company will submit at the meeting of shareholders next Friday is very short, and reads as follows: "The statement of accounts for the half year ending the 30th of June, 1893, shows the sum of £44,928 4s. available for dividends. The Directors, therefore, recommend the declaration of the following dividends, subject to income-tax—viz., a dividend at the rate of 5 per cent. per annum on the 5 per cent. preference stock, at the rate of 11½ per cent. per annum on the consolidated stock, and at the rate of 8½ per cent. per annum on the new stock, 1881; and that such dividends be payable on the 1st day of September next. The Directors have pleasure in reporting that the markets for coals and residual products have, in some measure, become more satisfactory. The past half year has been remarkable for the very high comparative temperature of the atmosphere, producing, as a natural consequence, a decrease in the amount of gas consumed in the district. This decrease has amounted, as compared with the corresponding period of 1892, to about 4 per cent. The Directors, however, have much pleasure in saying that the number of consumers has steadily increased. The entire plant of the Company is in excellent order." With reference to the accounts, the revenue for the six months amounted to £112,192, against £111,274 in the corresponding half of 1892. Comparing the figures for the two periods, it is seen that the sale of gas produced £88,661, as against £84,122; rental of meters and stoves, £3797, as against £3711; residual products, £19,640, as against £23,348 (tar being responsible for nearly £3000 of the difference); and rents and transfer fees, £94, as against £93. The expenditure totalled to £80,974; being a reduction of about £7000. The outlay for coal was £40,869, which is rather more than £4000 less than in the first half of last year. The profit amounts to £31,218. As to the results of the manufacturing operations, it is shown that 57,684 tons of coal were carbonized; or 2100 tons less than in the corresponding months of 1892. The quantity of gas made was 587,585,000 cubic feet, as compared with 602,416,000 feet. The residuals produced are estimated as follows: Coke, 38,456 tons; breeze, 4694 tons; tar, 543,182 gallons; and ammoniacal liquor, 19,242 butts (including 405 butts purchased).

DEVONPORT GAS COMPANY.

At the recent Annual General Meeting of this Company, the report which was submitted by the Directors stated that the receipts from gas amounted to £20,889, as against £20,569 last year; and from residual products, £4312, as compared with £5584. The total revenue was £25,999, against £26,938—a decrease of £939. The total expenditure was £21,556, or £673 less than the previous year; and the balance of profit was £4043. The contracts for the annual supply of coals entered into last year, although more reasonable than those of the two preceding years, had not sufficed to recoup the loss sustained, or to replace the heavy drafts made upon the reserve balances by the abnormally high prices prevailing in the year 1890-91. The contracts just completed for the supplies of the ensuing year were more favourable; but the market for residuals continued depressed.

The CHAIRMAN (Mr. R. C. Smith), in moving the adoption of the report, said in many gas companies the working balances had been entirely swept away; others drew upon their reserve funds, which were greatly exhausted; and many had to make overdrafts upon their bankers. As a result, the price of gas had to be raised by a large majority of undertakings throughout England, to enable the Directors to cope with the difficulties with which they were threatened. In their own case, they had been compelled to advance the price at the rate of 10 per cent.; but this was very small compared with the 100 per cent. rise in the price of coals. During the last eighteen months, they had again entered upon a period of decline; and from January last year to the present time, the trade of the Company had been rapidly declining. Though the contracts they had just completed were the most favourable for many years past, the Directors could not see their way to making an immediate reduction in the price of gas, as their last year's contract was not yet completed. The increment had realized only half what it did last year; and this was accounted for by the comparatively mild winter, and more especially the warm and brilliant weather of the past five months. Judging by their present prospects, and provided strikes did not happen, he had no doubt that at the end of the year the Directors would be able to congratulate the shareholders upon the position of the Company.

Mr. ROWE seconded the motion.

Mr. H. F. WILLEY contended that the interest on the reserve fund capital was a source of profit, and should appear in the profit and loss account. He added that gas companies throughout England stood very firm in public estimation; and he congratulated the Company upon their satisfactory position.

The motion was unanimously adopted.

On the motion of the CHAIRMAN, the statutory dividend of 10 per cent. on the original, and 6 per cent. on the guaranteed shares was declared.

The retiring Directors were afterwards re-elected; and the services of the Board, Secretary, and Engineer were suitably acknowledged.

Electric Lighting and Sewerage Works for Wolverhampton.—An inquiry was held at Wolverhampton last Tuesday by Mr. S. J. Smith, one of the Inspectors of the Local Government Board, into an application by the Town Council for power to borrow £1927, for the purpose of purchasing land for an electric lighting installation, and £45,918 for sewerage works. There was no opposition.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Report and Accounts.

The following report, with the accounts showing the working of the Company during the six months ending June 30 last (given on the next page), will be submitted to the proprietors at the half-yearly general meeting on Friday next:—

The accounts for the half year ending June 30, 1893, show that, after providing for all fixed charges, there remains a balance of £358,878 0s. 1d., out of which the Directors recommend the payment of the statutory dividend on the Company's ordinary stock at the rate of 12 per cent. per annum; carrying forward £21,082 12s. 1d. to the credit of the current half-year's account.

The quantity of gas sold during the past half year, when compared with that of the corresponding period of 1892 (correction being made in the figures for Leap Year), shows a decrease of 2·8 per cent. It is, however, satisfactory to be able to account for this by reference to the weather records of the two periods. In January there was a decrease in the temperature and in the amount of sunshine, as compared with January, 1892; and for that month there was an increase in the quantity of gas sold of 4·2 per cent. In each of the following four months, there was a remarkable increase over 1892, both in the temperature (averaging 10 per cent.) and in the amount of sunshine recorded (averaging 24 per cent.); and, month by month, there was a corresponding decrease in the quantity of gas sent out, as compared with the same periods in 1892. In the month of June, the temperature was again higher. But the amount of recorded sunshine was less than in June, 1892; and in this month there was an increase of 3 per cent. in the sale of gas.

In the market for residuals, coke has again realized low prices. But tar and liquor products have recently been slightly better; and the Directors have reason to expect that the advances secured for these will be maintained. Until, however, the general trade of the country revives, no great improvement can be looked for in this branch of the Company's business.

The shareholders will observe that the Official Auditor, in his certificate appended to the balance-sheet, notifies that forfeitures, amounting to £14, will have to be deducted from the dividend payable. These penalties have been inflicted upon the Company in respect of deficiencies in the illuminating power and purity of the Company's gas, as shown by the testing officials of the Local Authorities. In order to enable the shareholders to judge for themselves of the extreme care exercised by the Company's Carbonizing Engineers to send out gas in all respects fully up to the prescribed standard, the Directors give the following summaries of the daily reports of the official testers appointed by the Corporation of London and the London County Council respectively. During the half year just past, there were made 2257 tests of the illuminating power of the Company's gas, and in two instances only were there finable defaults—that is, where the gas was half a candle or more under the standard. During the same period, 6652 tests for impurity were made; and only on one occasion was there any finable default, and this was the result of an accident to the purifying machinery. In connection with this matter, the Directors have to report an attempt, recently made by the London County Council, to substitute, for the candle which has been in use for testing purposes for upwards of twenty years, one which possesses such greatly increased lighting power as to depreciate the recorded illuminating power of gas to the extent of about one candle. To this proposal the Directors, in common with the Directors of the other Metropolitan Gas Companies, will offer, in the interests of their customers, the strongest opposition, knowing as they do that gas made to pass such a test would have to be of so rich a quality as to be wholly unsuited to the consumers' existing burners and fittings, and equally unsuitable, and even more wasteful, for heating and cooking purposes, and that its manufacture would entail such an extra cost as would indefinitely postpone any reduction in the present price of gas.

The coal required for carbonizing during the current twelve months has been contracted for at rates which show a satisfactory reduction in price as compared with the contracts of recent years; and, if no untoward accident, or interference with the existing order of things, such as is referred to in the preceding paragraph, hinder it, the Directors will be able to announce a reduction in the price of gas as from the 1st of January next.

The parliamentary charges for the half year have been heavy; several proposals seriously affecting the Company having been under the consideration of the Legislature. In every instance, however, the Directors have been successful in securing due protection of the Company's interests.

The Directors deeply regret that, in April last, Mr. John Orwell Phillips, who had held the position of Secretary and Chief Officer of the Company for 32 years, was compelled, under medical advice, and in consequence of serious failure of health, to resign the position which he had held so long and with such conspicuous ability and success. The Directors, in consideration of his invaluable services to the Company, awarded him a retiring pension of four-fifths of his salary; and a special resolution confirming their action will be submitted to the meeting. Mr. Phillips will carry with him in his retirement the gratitude and esteem of the Court of Directors, and their heartfelt wishes that he may be spared, with improved health, to aid the Company with his experience for many years to come.

The Directors have appointed Mr. John William Field, late Accountant of the Company, Secretary and General Manager, in succession to Mr. Phillips; and it will be for the proprietors to fix his salary in accordance with the provisions of the Companies' Clauses Consolidation Act, 1845.

The Engineers of the several manufacturing and distributing departments have certified to the Court of Directors that all the plant of the Company under their charge respectively has been maintained in full efficiency during the half year.

Following the report is the statement of accounts. As usual, we merely indicate the alterations that have taken place in those portions which are not subject to much variation; giving the rest in full.

Nos. 1 and 2 are the statements of stock, share, and loan capital, the totals of which on June 30 last were as follows: Stock and share capital, £8,754,000; loan capital, £2,444,000.

No. 3 is the capital account, the receipts on which (with premiums) stand at £12,169,250. The expenditure is shown in the following items:—

Expenditure to Dec. 31, 1892			£11,253,478 0 11
Expenditure during the half year to June 30, 1893, viz.:—			
Lands acquired, including law charges	£8,257 16 11		
Buildings and machinery in extension of works	89,640 7 8		
New and additional mains and service-pipes	6,635 12 8		
Do. do. stoves	1,849 15 10		
	£106,383 13 1		
Cr. By meters returned from the district	£2230 5 4		
By depreciation of meters	4210 0 0		
Do. do. stoves	4817 0 0		
	11,257 5 4		
			95,126 7 9
			£11,348,604 8 8
Balance of capital account			820,645 11 4
			£12,169,250 0 0

Nos. 4 and 5 are the revenue and net revenue accounts. These are given in full on the next page.

No. 6 is a statement showing how the Directors propose to appropriate the balance applicable for dividend. It is as follows:—

June, 1892.			
—	..	Net balance from last account	£449 13 10
£350,032	..	Net revenue for the half year	358,428 6 3
£350,032			£358,878 0 1
(12 per cent.)		A dividend on the ordinary stock—	
£328,249	..	12 per cent. per annum on £5,646,590	337,795 8 0
£21,783	..	Balance carried to next account	£21,082 12 1

Nos. 7 and 8 are the reserve and insurance fund accounts. The former shows that the balance of the reserve fund on Dec. 31 last was £119,218 7s. 7d., which was increased to £120,835 7s. 7d. by the addition of £1617, interest on the sum invested. The insurance fund stood at £80,153 1s. 4d. at the end of the year. This was increased, by the interest on amount invested (£1087 1s. 4d.), to £81,240 2s. 8d.

No. 9 is the depreciation account. It stood at £40,952 at the close of the past year; and on June 30 last, it had been raised to £41,567 by the addition of £615 received as interest.

Nos. 10 and 11 are as follows; and Nos. 12 and 13 are given on the next page.

No. 10.—STATEMENT OF COALS USED, ETC.

Description of Coal.	In Store, 31st Dec., 1892.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, 30th June, 1893.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	313,267	884,888	910,549	1,679	285,927
Cannel	17,627	16,000	*15,931	...	17,696
Total	330,894	900,888	926,480	1,679	303,623

* In addition to this quantity, oil, the equivalent of 37,692 tons of cannel, was used during the half year.

No. 11.—STATEMENT OF RESIDUAL PRODUCTS.

Description.	In Store, 31st Dec. 1892.	Made during Half Year.	Used during Half Year.	Sold during Half Year.	In Store 30th June, 1893.
Coke—tons	22,262	569,677	146,780	431,513	13,646
Breeze—tons	4,906	60,923	20,024	44,748	1,057
Tar—gallons	839,612	9,690,411	10,038,230	16,172	475,621
Ammoniacal liquor—butts	24,230	268,818	270,446	8,776	13,826

The accounts are, as usual, signed by the Governor (Colonel Makins) and the Company's Auditors (Messrs. H. W. Chisholm and F. Farnan). As mentioned in the Directors' report, the certificate of the Official Auditor (Mr. H. G. Calcraft) which accompanies them states that "a forfeiture incurred during the half year, amounting to £14, must be borne and paid exclusively by and out of the divisible profits of the Company, and by way of reduction of dividend."

Water and Drainage Works for Millbrook.—The St. Germans Rural Sanitary Authority last Thursday agreed to accept a tender submitted by Mr. H. Weldon, of Birmingham, amounting to £5500, for the construction of water and drainage works for Millbrook.

The Birmingham Corporation Water Scheme.—The Water Committee of the Birmingham Corporation have accepted the tender of Mr. Henry Lovatt, of Wolverhampton, for the first section of the railway, connecting the watershed with the Cambrian line at Rhayader, which is to be laid down for the purpose of bringing material and stores on to the ground for the construction of the dams.

The Purification of the Thames.—The efforts of the London County Council to improve the purity of the water in the River Thames have begun to show satisfactory results. The new works at Crossness and Barking for the precipitation of the sewage of the Metropolis have now been in full working order for the past nine months, and during the year ending June last no fewer than 2,007,000 tons of sludge, containing 89 per cent. of moisture, which otherwise would have gone into the river, had been intercepted, taken out to sea by steamers, and deposited 20 miles below the Nore; while 10,000 tons of solid matter have been recovered, put into destructors, and burned. Mr. M'Dougall, who has been Vice-Chairman of the Main Drainage Committee of the Council for the past two years, and who now occupies the position of Chairman of the Committee, had the river trawled with a small net last Tuesday morning at Erith—a point 15 miles higher up than fish had been caught for 20 years. The net, when drawn up, was found to contain specimens of whitebait, sturgeon, jellyfish, and shrimps; and this was accepted as a very gratifying proof of the great advance which has been made to secure what the Council have in view—viz., the complete purity of the river.

ACCOUNTS OF THE GASLIGHT AND COKE COMPANY FOR THE HALF YEAR ENDING JUNE 30, 1893.

No. 4.—REVENUE ACCOUNT.

Dr. Cr.

June Half Year, 1892.	To Manufacture of gas—	£ s. d.	£ s. d.	June Half Year, 1892.	By Sale of gas—	£ s. d.	£ s. d.
£746,342	Coals, including oil, dues, carriage, unloading and trimming (see Account No. 10)	646,829 18 0		£1,352,570	Common gas, per meter, at 3s. 1d., 2s. 6d. and 2s. 5d. per 1000 cubic feet	1,340,473 9 1	
10,827	Salaries of Engineers and other Officers at works	11,462 10 2		49,709	Cannel gas, per meter	..	
169,583	Wages (carbonizing)	164,310 11 7			Public lighting and under contracts—		
	Purification, including £16,563/9/2			69,539	Common gas	71,499 3 3	
86,178	for labour	29,789 3 0		2,583	Cannel gas	..	
	Repair and maintenance of works and plant, materials and labour, less received for old materials,			£1,474,401	(See Statement No. 12.)		1,411,972 12 4
149,804	£2608 16s. 5d.	154,719 19 9	1,007,112 2 6	28,850	Rental of meters	..	29,122 14 5
	Distribution of gas—			8,224	Rental of stoves	..	8,697 2 3
	Salaries and wages of Officers				Residual products—		
24,615	(including Rental Clerks)	24,218 10 7		217,350	Coke, less £38,234 0s. 11d. for labour, &c.	213,677 13 7	
	Repair and maintenance of mains			4,982	Breeze, less £2843 7s. 2d. for ditto	3,629 2 6	
28,990	and service-pipes	25,812 3 5		82,092	Tar and tar products	72,249 4 2	
22,425	Repair and renewals of meters	22,295 0 3			Ammoniacal liquor and sulphate		
17,491	Stove fixing, repairs, and renewals	16,720 6 0		73,189	of ammonia	68,332 12 2	
	Public lamps—		89,046 0 3	£377,613			357,888 12 5
16,343	Lighting and repairing	16,714 12 3					
92	Experimental street lighting	42 2 6		4,037	Rents receivable		4,075 11 0
			16,756 14 9	230	Transfer fees		221 4 6
	Rents, rates, and taxes—			300	Canteen account		300 0 0
3,229	Rents payable	3,282 7 8					
71,654	Rates and taxes	86,475 19 7					
			89,758 7 3				
	Management—						
2,750	Directors' allowance	2,750 0 0					
200	Company's Auditors	200 0 0					
	Salaries of Secretary, Accountant,						
8,757	and Clerks	8,360 13 7					
14,610	Collectors' commission	15,024 7 11					
4,315	Stationery and printing	3,871 4 4					
1,989	General charges	2,033 18 9					
			32,240 4 7				
2,188	Parliamentary charges	..	2,788 3 5				
6,721	Law charges	..	6,757 5 2				
8,596	Bad debts	..	9,592 4 0				
9,980	Annuities	..	10,106 10 7				
	Public Officers—						
830	Gas Referees and Official Auditor	1,152 18 8					
734	Public testing-stations	622 18 4					
			1,775 17 0				
£1,354,242			1,265,933 9 6				
539,413	Balance carried to net revenue account, No. 5		546,344 7 5				
£1,893,655			1,812,277 16 11	£1,893,655			1,812,277 16 11

No. 5.—NET REVENUE ACCOUNT.

Dr Cr.

June Half Year, 1892.		£ s. d.	£ s. d.	June Half Year, 1892.		£ s. d.	£ s. d.
£62,660	To Interest on debenture stocks and bonds, accrued to June 30, 1893	..	62,659 12 6	£206,876	By Balance from last account	333,384 14 4	
74,034	Dividend on the preference stocks	74,015 5 0		121,373	„ Amount withdrawn from reserve fund	..	
							333,384 14 4
47,500	Dividend on the maximum stocks	47,500 0 0			Less dividend on the ordinary capital		
			121,515 5 0	328,249	for the half year to Dec. 31, 1892.	..	332,935 0 6
5,187	Interest on temporary loans and sundry funds		3,741 3 8				449 13 10
	Balance applicable to the payment of dividend on the						
350,032	ordinary stock		358,878 0 1	539,413	„ Revenue account (No. 4)	..	546,344 7 5
£539,413			546,794 1 3	£539,413			546,794 1 3

No. 12.—STATEMENT OF GAS MADE, SOLD, Etc.

Description of Gas.	Quantity Made.	Quantity Sold.			Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity Sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	9,938,103	560,762	8,757,754	9,258,516	136,134	9,394,650	543,453	50,895
June half year, 1892 (*Common and Cannel.*)	10,264,260	504,526	9,092,215	9,596,741	138,143	9,734,884	529,376	51,718

No. 13.—GENERAL BALANCE-SHEET.

Dr. Cr.

June Half Year 1892.		£ s. d.	£ s. d.	June Half Year 1892.		£ s. d.	£ s. d.
£	To Capital—			£			
677,930	Balance at credit thereof	..	820,645 11 4	182,912	By Cash at Bankers	..	124,543 10 8
	Net Revenue—						
350,032	Balance at credit thereof	..	358,878 0 1	300,000	Amount on deposit at interest	..	400,000 0 0
	Reserve Fund—				Amount invested—		
117,601	Balance at credit thereof	120,835 7 7			2¾ per Ct. Consolidated Stock .. £201,702 3 7	..	203,566 5 1
	Insurance Fund—			203,566			
79,066	Balance at credit thereof	81,240 2 8			Stores on hand, viz.—		
			202,075 10 3		Coals	199,907 12 5	
	Depreciation Fund—			107,388	Coke	6,657 2 0	
40,347	Balance at credit thereof	..	41,567 0 0	18,785	Tar and ammoniacal liquor and		
	Interest on debenture stocks and bonds,				products	49,638 17 11	
62,660	due on June 30, 1893	..	62,659 12 6	59,963	Sundry stores	213,548 5 3	
	Preference and maximum dividends			224,923			469,751 17 7
121,535	due on June 30, 1893	..	121,515 5 0		Accounts due to the Company, viz.—		
	Unclaimed dividends due on June 30,				Gas and meter rental—		
10,667	1893	..	8,011 16 0		Quarter ending June 30, 1893	558,993 1 11	
	Sundry tradesmen and others, for			557,216	Arrears outstanding	24,345 5 2	
	amount due for coals, stores, and						
271,836	sundries	..	218,652 5 0	27,208			583,338 7 1
1,667	Benevolent Fund	..	1,667 6 8				
				31,188	Coke and other residual products	30,950 8 10	
				20,242	Sundry accounts	23,521 17 7	
							54,472 6 5
1,733,341			1,835,672 6 10	1,733,341			1,835,672 6 10

THE CRISIS IN THE COAL TRADE.

Manifesto by the Coalowners' Federation.—Commencement of the Strike.

The following statement, signed by Mr. T. Ratcliffe Ellis and Mr. F. Parker Rhodes, Secretaries of the Coalowners' Federation, was published in the daily papers last Thursday:—

We are desired by the Federated Coalowners to state on their behalf, as briefly as possible, the main grounds which have led them to ask for a reduction of 25 per cent. in miners' wages. As there seems to be some misunderstanding with regard to the actual demand made, it is desirable to make perfectly clear what that demand really means. The Chairman at the last conference between the representatives of the coalowners and miners, on the 21st of July, explained that the reduction of 25 per cent. asked for was intended to be taken off exactly in the same way that the advances in recent years had been given. Throughout the districts embraced by the Miners' Federation, with few exceptions, those advances were given on the standard rate of wages prevailing in 1888; and, where that was the case, all that was intended was to reduce the present wages, not by one-fourth of their full amount, but by one-fourth of the standard wages on which the advances were given. The standard rate being taken at 100 was increased by advances to 140. The proposed reduction is one-fourth of 100, leaving wages still 15 per cent. above the standard rate. In some few instances, the advances have been given cumulatively; and in such cases the reduction would have to be made on the same basis.

Coalowners are of opinion that the greatly reduced value of coal entitles them to a corresponding reduction in wages. In the autumn of 1888, the coal trade, which had for some years been in a very depressed condition (the selling prices having reached their lowest point about July in that year), began to improve; and an advance in wages of 10 per cent. was conceded by the employers at the end of 1888. This was followed from time to time by further advances, amounting in the aggregate to 40 per cent.—the last coming into operation on Aug. 1, 1890. These advances were asked for on the ground that the selling prices of fuel had advanced; that the profit made by the coalowners had increased; and that the miners ought, by means of increased wages, to share in those increased profits. The coalowners recognized the force of the men's contention, and conceded the advances. At the time when the last advance came into force, the Board of Trade returns show that the average price per ton of coal exported from the United Kingdom was 13s. 1¼d. Since that time the price of coal has fallen heavily; and the Board of Trade returns show that the average price per ton of coal exported from the United Kingdom during the month of June last was only 9s. 4¾d. In other words, between August, 1890, and June of the present year, the average price for export coal has fallen 3s. 8¾d. per ton. The prices of fuel for home consumption have also largely decreased. This is verified by the published price of coal in the Thames. In 1890, the price was 22s. 6d. per ton; while in 1893, it has fallen to 15s. per ton—a decrease of 7s. 6d. per ton. These figures refer to seaborne coal; but coal raised in the inland coalfields and sent to London has, of course, to compete with this fuel. The price of locomotive coal for railway purposes has also declined from 10s. 6d. per ton for the best Yorkshire steam coal at the pit in 1890, to 7s. 3d. per ton for the same commodity in 1893; and inferior steam coals have declined in a still greater proportion. There has also been a corresponding reduction in the price of gas coal; and, in fact, the decline in value has been general and cannot be disputed. If, therefore, advances were granted in consequence of rising values in 1888, 1889, and 1890, as was the case, the coalowners are not unreasonable in pressing for reduced wages when prices have fallen to such an extent as they have done.

It would appear from Mr. Pickard's manifesto that the fact that there is a great decrease in the selling price of coal is not disputed; but he attributes it to the improvidence of the coalowners—alleging that they have given away, as he expresses it, so much per ton to the general public. It is hardly necessary to waste time in controverting this statement. Coalowners, like other people, engage in trade for the purpose of making profits. It is their interest to obtain as high a price as they can. The fall in prices is not due to any desire on their part to reduce the market value of the commodity they sell, but to the fact that a general trade depression has reduced the available selling price; for if they are to sell at all, they must sell at the market price. If coalowners place upon their fuel too high a price, they will see their trade transferred to other competing districts which can supply the market at a lower price. This process has, in fact, been going on, and is going on with increasing rapidity. The published returns of the output of coal in the United Kingdom for the past year show a large increase in the Scotch output—amounting in round numbers to 1,750,000 tons. They also show an increase in the South Wales output of nearly a million tons; while there is a decrease in the output of the districts embraced in the Miners' Federation. In other words, Scotland, where there has been a large reduction of wages, has increased its output by the amount stated. South Wales, where there has also been a large reduction of wages under the sliding scale, has also increased its business to the extent named; while in the Midland coal-field, with a high cost of production consequent on a comparatively higher wage-rate, the output has decreased.

The inference to be drawn from these figures is obvious. They show that Scotch, Welsh, and north country coal is beating the coal from the Federation districts, in competitive markets, both at home and abroad. Mr. Pickard, however, appears to think that all that is needful for a coalowner selling coal is to ask and have such price as he thinks fit, and that the value of an article in the open market can be maintained or enhanced by increasing the cost of production. We regret to see this economic fallacy is apparently shared by the colliery owner whose letter Mr. Pickard quotes in his manifesto, and whose colliery, from the peculiar reference in it to the "canal ton," we should imagine is located in Staffordshire.

Mr. Pickard, in his manifesto already referred to, quotes dividends paid in the past year or two, in some cases by colliery companies and in other cases by manufacturing concerns. As to the former, it is difficult to see how dividends declared and paid away in previous years can affect the ability to pay wages in 1893 under entirely different conditions; while as to the latter, the price of fuel is not dependent on the wealth of the consumer, but is regulated by the market value of the day.

Mr. Pickard also states that "the coalowners have gone the wrong way about the business," and that they have deliberately "shut the mouths of the men's leaders by not merely demanding, but actually putting in notices for, this reduction." It is impossible to understand what this means. The owners, in accordance with a pledge given in 1890, communicated to the leaders of the men the fact that they would be compelled to apply for a reduction in wages; and, by arrangement with their Secretary, a date was fixed for a meeting to discuss the matter. That meeting took place; and the owners' Committee, through the Chairman, explained fully to the miners' representatives the reasons for requesting a reduction. The miners' representatives, on their part, gave no answer, and merely stated that the matter must go before their constituents, and that it would be a month before they could reply. It was explained by the owners that, although notices would have been given, they need not interfere with friendly negotiations; and they were, in fact, so given as to allow a full four weeks to elapse before they would expire. The answer, however, given by Mr. Pickard, on behalf of the miners, when he conveyed the reply of the latter to the owners, at the meeting held on July 21, showed that neither a few days' time nor the amount of the proposed alteration in wages was material; for he stated that the men would not accept the reduction "or any part thereof," and just as emphatically refused the offer of the owners to submit to arbitration. That reply brought matters to a close, and left only one course available.

The owners offered arbitration, not from weakness, but well knowing the strength of their case. If that case had been overstated or inaccurately put, their own books and accounts would convict them. We freely admit, and every coalowner admits, that the miner ought to be paid good wages for the work he performs, just as the coalowner ought to receive a fair profit on the capital invested in his mine. But both miner and mineowner are alike dependent on the sale of the article they jointly produce both for wages and profits; and when trade is depressed and prices are receding, neither can receive as much as when trade is good and prices are increasing. The owners have deferred making any request for a reduction in wages long past the time when they were fairly entitled to do so; and now a substantial reduction has become essential to preserve the trade upon which both owners and miners depend. The coalowners know well the injury that a prolonged strike will cause; but pits cannot be worked for long at a loss for the purpose of paying high wages. This would mean ruin sooner or later; and therefore it seems inevitable, though everyone regrets it, that the question at issue must be decided now in the only way that the reply of the leaders of the men leaves open.

The strike of the coal miners against the proposed reduction in wages commenced, as arranged, last Friday, when it was estimated that something like 150,000 men left work; the number being increased to 200,000 by Saturday. At the present time the Northumberland and Durham men are holding aloof; but work in the great coal-mining districts of Lancashire, Cheshire, Yorkshire, Cumberland, Derbyshire, Leicestershire, Staffordshire, Warwickshire, North Wales, Somersetshire, Stirlingshire, and Monmouth, will in the course of a week or so be practically at a standstill. Notices for terminating existing agreements with the men were given a fortnight ago at collieries employing 168,000 men, belonging to the Miners' Federation; while notices had not been given to 37,000 men, of whom 21,000 were in the Midland Federation district, 7800 in Yorkshire, 5000 in North Wales, and 2000 in Lancashire. The 11,000 men under the South Staffordshire Wages Board will continue at work pending an audit of the employers' books. Outside the Federation, there are about 190,000 men employed in and about the mines, of whom 26,000 will be included in the strike; and of the remainder only a small number are actual coal hewers. It is estimated that the number of men on strike will be increased to 230,000 when the further notices expire.

Birmingham merchants reported last Friday that all contracts were closed with South Yorkshire, Leicestershire, Derbyshire, and Warwickshire; and the collieries in these districts have no stocks on their banks, though an immense quantity of fuel is loaded on trucks in the railway sidings—all under contract to London merchants. The railway companies, it is stated, have undertaken to store coal without demurrage, and despatch it as required during the crisis. The bulk is house coal, and the quantity of works fuel available is infinitesimal. As prices have already advanced considerably, only manufacturers who are compelled to keep in operation will buy. Numbers of blast-furnaces in Northamptonshire, Derbyshire, Lincolnshire, and South Yorkshire will inevitably be damped down or blown out. Great anxiety prevails in Birmingham and the surrounding manufacturing districts, where the contraction of the supplies of fuel is already seriously felt. The Gas Committee, however, are by no means alarmed. At their weekly meeting last Wednesday, it was reported that they were prepared for any stoppage in the supply of coal which was likely to arise in connection with the present dispute. Contracts were recently entered into for the coming year, under conditions providing for regular delivery. The strike would doubtless interfere with this; and, as a result, dislocate to some extent the arrangements made by the Committee for the work of stacking in view of the heavy winter consumption. After the strike, greater quantities would have to be supplied to make up arrears, and more stacking would be entailed. However, there has already been stacked between 69,000 and 70,000 tons of coal, which is equal to about three months' carbonization at this period of the year.

Gas Coal Contracts.—The Middlesbrough Corporation Gas Committee have had before them tenders for the supply of 35,000 tons of coal; and they have decided to recommend the Council to divide the contract among various firms, at prices ranging between 7s. and 8s. 7½d. per ton. The Lancaster Corporation have, on the recommendation of the Gas Committee, accepted tenders for gas coal at 10s. 9d., 11s., and 11s. 9d. per ton for a term of twelve months.

THE SOUTH METROPOLITAN GAS COMPANY AND THEIR WORKMEN.

Annual Meeting of Directors, Officers, and Men.

The Fourth Annual "Bonus Festival" of the South Metropolitan Gas Company took place in the cricket field and recreation ground at the Old Kent Road station on Saturday, the 22nd ult. As on previous occasions, the men and their wives assembled in large numbers. The weather being fine, and the arrangements perfect, all seemed greatly to enjoy the proceedings. At half-past two, the Old Kent Road Brass Band performed selections of music, under the direction of Mr. T. Ryman; and at three o'clock Mr. George Livesey took the chair at a platform very gaily decorated with flags, bunting, flowers, ferns, and palms. He was supported by Mr. Robert Morton, Mr. Simpson Rostron, and Captain Heathorn (Directors), Mr. Frank Livesey (Chief Engineer), Mr. Frank Bush (Secretary), the Engineers of the stations, and other officials.

The CHAIRMAN, in his opening remarks, said it was to him a very great pleasure, on behalf of the Directors and officers to welcome the men again to their annual festival to celebrate the profit-sharing scheme. He did not intend to speak for long, but he should like to say a few words about the scheme. It was introduced not quite four years ago; having been proposed in November, 1889. The Directors had two objects in view in starting it—one to induce all connected with the Company to take an interest in its welfare; and the other to give all their employees an opportunity of making some provision for the future. Speaking on behalf of the Board, he could say that good progress had been made towards the attainment of both these objects. They had found that a large number of the workpeople employed there had taken, and were taking, a great interest in the welfare and prosperity of the Company. They were working cheerfully, intelligently, and with good will to forward its interests. With regard to the second object—that of enabling the workmen to provide for the future, and to improve their position financially—he might point out that, in arranging for taking their money on deposit, they were very particular that no inquiries should be made, and that nobody should know any more about it than if they were to place it in the Post Office Savings Bank. He had been furnished with detailed figures which showed that on the 1st of July last there stood to the credit of the workmen, at 4 per cent. interest, no less a sum than £31,500. But the men had shown their confidence in the Company by doing something more than this. The Company's stock paid rather more than 5 per cent., and £4158 had been invested by them in shares. This was getting on; but he should not be satisfied until a larger proportion saved their annual bonus. At present, about 44 per cent. left it with the Company to accumulate; but what about the remaining 56 per cent.? He had always said that these bonuses were their own; and they were perfectly free to deal with them in any way they pleased. If the workmen would save money, they would be able to hold their own, and resist any attempted injustice. On the other hand, if they were asked to strike, they would be more likely to think about the matter, to reflect that it had taken them some little time to put by that money, and to ask whether it would be wise to let it go. [A VOICE: We've done with strikes.] They had done with strikes. He was very glad indeed to see so many of their wives present. The Company had increased the holiday pay from one week to two, so as to give the men the opportunity of letting their wives and children share the holidays with them. They wanted to see such a real union of employers and employed that other places would take note of what they were doing, and say: "Well, here is a good example; let us see if we cannot follow it."

Captain HEATHORN, in the course of a few remarks, said that while they were there for amusement and pleasure, the gathering afforded them an opportunity of renewing their mutual confidence, without which things could not go on right. When each one knew exactly what he wanted, and they were all pulling together, it was not difficult to get on.

Mr. FRANK LIVESEY said he was pleased to have the opportunity of making a few remarks, because, if he did not, people might say there was some failure in the profit-sharing scheme. This was not the fact. He could bear his testimony to its success, because they were working heartily together, and were constantly receiving suggestions—some of them being very useful ones, and of great advantage to the Company. The difference between a willing workman and one who worked under what he considered a hard taskmaster was very great indeed; and the feelings he frequently heard expressed by the men showed that there was a very different feeling prevailing there to that which existed in some other places.

Mr. BUSH said he was glad to see that their profit-sharing ardour had not diminished one iota. Referring to the 4 per cent. bonus which they had received, they might say that they had had 5 per cent. once, and would like to have it again. He agreed with them; and the way to get it was for each one to do his best to promote the interests of the Company in the forthcoming year.

Mr. J. F. BRAIDWOOD (Greenwich) said he thought things were very encouraging; but there was a great deal more the men could do to help the officers. They had had 5 per cent. once; and he hoped they would go on until they received not only 5 but 8 per cent.

Mr. C. C. CARPENTER (Vauxhall) said he stood before the men somewhat of a convert to these meetings, because when they were first started he was not so enthusiastic as many others were; but the results had been excellent.

Mr. J. TYSOE (East Greenwich) fully endorsed the remarks made by the Chief Engineer as to the very marked improvement which had taken place in the conduct of the men since the introduction of the profit-sharing system.

Mr. A. F. BROWNE (Rotherhithe) bore testimony to the fact that the agreement system was steadily growing in the appreciation of the servants of the Company who were in receipt of weekly wages.

The CHAIRMAN then presented a number of certificates of the St. John's Ambulance Association to members of the ambulance class which had been started and was warmly supported by the men.

A magnificent timepiece was next presented to Mr. H. C. Sims, the Accountant, on behalf of the members of the Profit-Sharing Committee. The idea originated with the workmen's representatives. It bore the following inscription: "Presented to Mr. H. C. Sims by the Profit-Sharing Committee, in token of their appreciation of his earnest endeavours to promote the success of the scheme, and of the uniform kindness and courtesy he has shown to all the members in his capacity of Secretary to the Committee."

The CHAIRMAN said the Directors had thought it would be well if some recognition were made in any case where the workmen had rendered special services to the Company. During the past year, Mr. H. Joyce, at East Greenwich, had suggested a different arrangement of the retort-furnaces, whereby a considerable improvement in the working had been effected. The Directors had marked their appreciation by a pecuniary reward, as well as by certificates, in the following form: "This is to certify that the thanks of the Directors are presented to Mr. Walter King, of the Greenwich station, for suggesting improvements in retort-furnaces, whereby a considerable saving in labour and material is effected." Certificates were also awarded to Mr. J. Strutt of Vauxhall, for his untiring energy and faithfulness; to Mr. J. W. Jones, for his management of the horses, &c., at the Old Kent Road; and to Mr. W. Banford, at the same station, for his good management of the barges; while Mr. H. Campbell received recognition for obtaining the largest number of new consumers (149) in the year. A bonus of 2s. 6d., 3s. 6d., or 5s. was given for each one.

The certificates having been formally presented by the Chairman, the usual votes of thanks were passed and acknowledged.

After the meeting, all present adjourned to the tents, where tea had been provided for over 5000 persons. The behaviour of all was most orderly and exemplary. After tea, a concert and other amusements followed; and the Fourth Bonus Festival, which was evidently a very successful and enjoyable one, came to a close.

ELECTRIC LIGHTING IN BIRMINGHAM.

Corporation versus Company Control.

At the Meeting of the Birmingham City Council last Tuesday—the MAYOR (Alderman Lawley Parker) presiding—there was a discussion on the question of the Corporation undertaking the supply of electricity, or giving their consent to an extension of the powers of the Birmingham Electric Supply Company.

The MAYOR, in accordance with a recommendation of the General Purposes Committee, moved that the notice of the Birmingham Electric Supply Company to apply for a Provisional Order extending their area should be referred to the Committee, with power to take such action in relation thereto as they might think desirable for protecting the interests of the consumers and the Corporation. The Committee, he said, had devoted much time to the consideration of this subject. A year ago they recommended that the matter should be delayed for twelve months, in order that further information might be obtained as to the success of the electric light from a commercial point of view, both in Birmingham and elsewhere; but they were agreed that, such information being obtained, they would then be bound to come to a conclusion one way or another—whether they should apply for an Order themselves, or whether they should grant on fair and proper terms power to the present or some other Company to extend the electric lighting in the city. The Birmingham Electric Supply Company were seeking to obtain power to supply Edgbaston and the jewellery district; and, in due course, they would have the details of the proposed Order to deal with. It appeared to the Committee that there were two grounds which might justify the Council seeking for powers themselves. The first was a reasonable anticipation that the profits to be derived would be large; and the second, that it was necessary in order to safeguard the interests of the consumers and the public generally. The returns which had been obtained showed that a good many local authorities had obtained Provisional Orders. If they were analyzed, he thought it would be found that in many cases those Orders had been procured in places where the gas undertaking was not in the hands of the local authorities; and in some instances it might readily be believed that the authorities desired to have something in hand where they might secure good terms from the gas companies. While many had secured Orders, very little progress had been made. But putting together all the statistics that had been obtained, the General Purposes Committee had come to the conclusion that both in the case of companies and corporations the profits at present were inconsiderable, and there was no indication that they were likely to be very large. They found evidence of very substantial amounts of misspent capital in first inaugurating undertakings. He was not now referring to the Birmingham Company; but so far as the London Companies were concerned, speaking generally, if they took the market value of the shares as an indication of whether or not they had been successful, they would be obliged to come to the conclusion that there had been a great deal of capital lost, and that there were no indications of very large profits being earned In case the Corporation should decide on applying for an Order to supply the electric light in any part of the city, and especially the Edgbaston district and the jewellery quarter, they would have to acquire the present Company's undertaking, in order to make it succeed. They would have to purchase it by agreement; and he thought it was not unlikely that the Company might require a considerable premium in anticipation of the future which they believed to be before them. Then they had to regard this aspect of the case—that, while electric lighting was a success in some directions, they did not know that they had reached a point at which they could say, so far as the supply was concerned, that one or another was the right system, and that it might not be superseded by a better system in the future; and if they acquired the present plant, and laid down mains and so on for a new district, they might find there was a considerable deterioration, in consequence of the discovery of some new system. This was a risk that ought to be taken into account before they came to a conclusion. Then they had to remember that electric lighting was a very technical matter; that they would be largely in the hands of the

engineers; and that the amount of working expenses would not be less, but probably greater, under the management of the Corporation than they would be under a company. The Committee, therefore, saw no encouragement to embark upon the enterprise so far as profit was concerned. Then with regard to the second point—the safeguarding of the interests of the public and the consumers—the Corporation had power to apply to the Board of Trade to revise the prices charged every seven years, and the period of appeal was now only three years distant. Besides this, there was no monopoly of supply; and the best safeguard was competition. The Corporation might at any time grant a concession to another company, or undertake to supply the light themselves. Large consumers could also lay down their own installations; so that, altogether, ample safeguards already existed. On the whole, the Committee came to the conclusion that it would be better, for the present at least, that they should not become suppliers of the electric light and power themselves; and, therefore, that they should not oppose the application of the Company for a further Provisional Order, except upon clauses; and here, from past experience, he believed they would not find the Company unreasonable in negotiation with the Corporation.

Mr. REYNOLDS seconded the motion.

Mr. BARCLAY thought the lessons of the past in reference to the gas and water works would have taught the Council the desirability of undertaking the supply of the electric light themselves. It was not a new thing. Great experience had been acquired; and the fact that the Electric Light Company were applying for an enlarged area showed that they were satisfied with the results so far. There was no town in the country which offered so good a field for the supply of electricity, inasmuch as it would be available for power during the daytime in a large number of manufactories, as well as for illuminating purposes at night. He had hoped that the Mayor would have told them something about Bradford and St. Pancras. The authorities at Bradford were so satisfied that they were going forward and increasing their operations. The ratepayers in those places were paying very much less per unit than they were in towns where the light was supplied by companies.

Alderman JOHNSON remarked that there was no real analogy between the gas or water and the electric light. It was not like the water, a necessity of life; and it was not like the two gas undertakings, practically a monopoly. In the case of the electric light, it was legally competent for the Corporation, when electric lighting had become a certainty (which it was not at present), to set up an installation of their own. The real question the Council had to face was this: Were they prepared, with their present commitments, to sanction an expenditure which must in a very short time run up to a quarter of a million of money; and were they, with the great mass of work which they already had in hand, prepared to take on a new department, requiring the close attention of very competent persons?

Alderman POLLACK supported the resolution, and expressed his confidence that the gas undertaking had little to fear from electric lighting. He agreed with the Committee that the prospect of profit was not sufficient to induce the Corporation to undertake the responsibility; whereas, when they bought the gas and water works, they had the experience of fifty years upon the point. With regard to the effect upon the Gas Department, he might mention that in the Market Hall Ward, where the Electric Light Company had their principal field, the gas consumed in 1890, when the Company had hardly been formed, was 326 million cubic feet. In 1891, when the operations of the Company were commencing, the consumption had risen to 344 millions; and last year it was reduced to 337 millions. It had, however, to be remembered that last year was a bad one for gas supply; and they also lost the greater part of their supply to the Post Office, which had now its own electrical installation. In 1890 the Post Office consumed 6½ million cubic feet; but last year it burnt only 1¼ million feet. The Gas Committee could, however, take care of themselves; and the Council might consider the question before them without any reference to the Gas Department.

The MAYOR, in reply, said that the General Purposes Committee approached this question with a strong feeling in favour of the Corporation taking up the electric light; and it was only when they probed the matter to the bottom that they came to a contrary conclusion. With regard to Bradford, which had been mentioned by Mr. Barclay, he found that it had expended £42,000 upon a preliminary installation. The charge was 5d. per unit, as against 8d. charged by the Birmingham Company; and, though they showed a profit, it was nevertheless true that they had placed nothing to depreciation. The St. Pancras Vestry had spent £90,000 of capital; the charge per unit was 6d.; and they had obtained £1068 towards the sinking fund, which at 5 per cent. ought to be £4500. So there would appear to be a loss of £3500. One Electric Lighting Company in London had spent £805,000, without paying any dividend; and their £5 shares were quoted at from 15s. to £1.

The motion was carried.

The Work of the London County Council.—At the meeting of the London County Council on Tuesday last, the Chairman (Mr. J. Hutton) delivered his annual address. In the course thereof, he stated that the quantity of water used for the extinction of fires during the past year was estimated at 137,000 tons. More than half this was taken from the river, canals, and docks. The total number of hydrants fixed or ordered to be fixed in the County of London stood at the satisfactory figure of 16,312. These had cost about £150,000; and for some years the expenditure on hydrants would continue to be heavy. The total capital expenditure on main drainage works from their creation had been £7,466,222; and the annual expenditure for maintenance was £194,765. Taking the two outfalls at Barking and Crossness together, the sewage treated last year amounted to nearly 64 billion gallons. The amount of sludge obtained stood at no less than 1,785,700 tons. The whole of this quantity had been conveyed to sea by means of five huge vessels. The result had been that the river was generally admitted to be in a better state than for many years. With regard to constant water supply, the Chairman stated that the percentage of houses under constant service was rapidly increasing.

THE INSPECTION OF GAS-LIQUOR AND OTHER WORKS UNDER THE ALKALI ACT.

The Sub-Inspectors' Reports.

In the JOURNAL last week, we dealt with the report of the Chief Inspector under the Alkali, &c., Works Regulation Act, 1881 (Mr. A. E. Fletcher), for the past year. We now give a few extracts from the reports made to him by the Inspectors of the various districts into which the area under his supervision is divided. These are: (1 Ireland, Mr. E. G. Ballard; (2) North of England, Mr. B. E. Smith, F.I.C., F.C.S.; (3) Cheshire, North Wales, and part of Lancashire, Mr. E. G. Ballard, with whom is associated Mr. J. Affleck, M.A., D.Sc., as an additional Inspector for the Widnes sub-district, comprising Widnes and Runcorn; (4) East Lancashire and Yorkshire, Mr. R. Forbes Carpenter, F.I.C.; (5) South Midland, Mr. E. Jackson, F.I.C., F.C.S.; (6) South-West of England and South Wales, Mr. A. C. Fryer, Ph.D., M.A.; (7) South-East of England, Mr. F. N. Sutton, F.I.C.; Scotland (which, since the superannuation of Dr. Blatherwick, in 1891, has been under the inspection of Mr. W. S. Curphey) is, as usual, the subject of a separate report.

In Ireland there are 21 sulphate of ammonia works, which last year produced 3021 tons of sulphate. Mr. Ballard had but little cause to complain of the way in which this class of works was conducted; but he found that in one or two cases there was room for improvement in the plant. The continuous system of distillation is very prevalent in the larger works, and most of them absorb in oxide purifiers the sulphuretted hydrogen evolved. He expresses the hope that those in which it is now burned in the retort flues or otherwise will follow the example of the better class of works and adopt purifiers. Of the 61 works of all kinds in his district, 9 have the continuous system of distillation; 13, the intermittent system; 12 absorb the sulphuretted hydrogen in oxide purifiers; and 10 burn it.

In the North of England, there are 34 sulphate of ammonia, 1 gas liquor, and 1 liquid ammonia works. The output of sulphate was 4590 tons, of which 610 tons were obtained from ammoniacal liquor derived from coke made in ovens. In this district, complaint is still made, and Mr. Bernard Smith thinks with justice, of the nuisance caused by the Chance-Claus sulphur-recovery process. He considers that, as far as the final exit gases are concerned, the difficulty of removing the sulphuretted hydrogen has been practically overcome, although not in the best possible way. The gases from the two plants at work in the district are burned in a specially constructed furnace. This, he points out, only converts the sulphuretted hydrogen into sulphurous acid; and, while destroying the objectionable smell, greatly adds to the acidity of the escaping gas. He says the method is really bad; it is both costly and wasteful, and fails utterly to meet the difficulty from a scientific point of view. The source of the present nuisance, and hence complaint, arises from the liquors discharged along with the spent waste from the "carbonators." These liquors which get into the discharge-pipes from leaky taps, &c., always contain, in varying quantities, sulphides which, at the moment of discharge of the spent vessel, are decomposed by the excess of carbonic acid in the spent waste, with the evolution of sulphuretted hydrogen. These puffs, so to speak, of sulphuretted hydrogen are carried to a considerable distance, and at times are thus a source of distinct nuisance. In the two gas-works in the district where the Claus sulphur-recovery process is employed in the treatment of the foul gases from sulphate of ammonia manufacture from gas liquor, they have attached lime scrubbers and oxide purifiers to deal with exit gases.

In the portion of district No. 3 which is under the supervision of Mr. Ballard, there are 6 gas liquor and 25 sulphate of ammonia works. The chief works of the former class are those in which the ammonia-soda process is carried on. Some large new works started early last year have been the cause of much complaint with respect to the discharge into the air of sulphuretted hydrogen, which at times accompanies the exit gases from the process of manufacture. The owners were twice fined during the year—once for infringement of the Act in this respect, and once for neglecting to keep the oxide purifier, provided for the arrest of this noxious gas, in proper condition. Another new works of this class will shortly be ready for registration. This will make in all five ammonia-soda works in the district. The manufacture of sulphate of ammonia is carried on in a satisfactory manner; and there have been no escapes of sulphuretted hydrogen to report. The continuous system of distillation is gradually pushing out the old intermittent system. The total quantity of sulphate manufactured in the district (excluding Widnes and Runcorn) was 3012 tons. In the sub-district under Mr. Affleck, there are 68 processes in use. These were for the most part in regular operation throughout the year; and they were periodically inspected with that degree of frequency which their relative importance demanded. In this inspection, some 675 visits were paid to the works for the purpose of examining the condition of the various plants, and of ascertaining, by observation as well as by chemical tests, whether the escapes of noxious gases were maintained within the limits prescribed by the Act. The large and ever-increasing deposits of alkalia waste, and the drainage flowing from them, were also frequently visited and received their due share of attention. Mr. Affleck expresses his gratification at being able to report that, generally speaking, a very considerable improvement has been noticed in his district during the past year, as compared with the year 1891, in regard to the quantity of noxious gases generally passing from the works, and more especially in regard to the diminished escapes of sulphuretted hydrogen—the most detested of all the gaseous pests of the alkali districts—both from the works and from the waste deposits. This improvement has, he says, been felt and acknowledged by all classes of the community both in Widnes itself and in the surrounding farming and residential districts. Mr. Affleck deals at some length with the improvements effected by the United Alkali Company in their plant and general management; and he says that the beneficial results of this policy become gradually more manifest. With regard to the recovery of sulphur from alkali waste, he states that the Mond process has been totally abandoned in the district; giving place to the Chance-Claus process, which proves more successful every year. The total

quantity of sulphur recovered from alkali waste by this process in Widnes during the past year, according to a return furnished by the Company was 15,924 tons, together with about 1500 tons of sulphuric acid of 123° Twaddel, recovered in two of the works from the waste gases of the Claus kilns. Of the total quantity of waste produced in the Company's works, about 75 per cent. was treated, and thereby rendered harmless for depositing on the land. Besides the waste made in their works, about 700 tons per week are produced in another works not on the register, for treating which no plant has yet been provided. When all the plant now erected by the Company can be put in operation, the Directors confidently anticipate that they will be able to desulphurize *the whole* of their waste. The delay in doing so now is chiefly caused, it is understood, by difficulties that have arisen in transferring the waste by rail from one works to another. Mr. Affleck has nothing of any moment to report respecting the few sulphate and muriate of ammonia works in his district. The manufacturing apparatus has, he says, been kept in very satisfactory order; and the works have given the public no cause to complain of any noxious gases escaping from them. Four of the plants were working during the year, and produced of the two salts a quantity equal to 1112 tons of sulphate.

At the only works in the East Lancashire and Yorkshire district, under Mr. R. Forbes Carpenter, in which alkali waste is treated by the Chance process, the exit gases from the Claus sulphur chambers pass finally to a furnace where the resultant product is sulphur dioxide. Eleven tests of these were taken from the flue after passing the furnace; and in four instances small traces of unburned sulphuretted hydrogen were found. Modifications of the arrangements have been made, which it is hoped will meet the requirements of complete combustion. Two small gas-liquor works were registered last year for the production of sulphate of ammonia; and one works has been transferred to the South-Midland district, otherwise the district total make of sulphate of ammonia (including the equivalents of muriate and liquor ammonia) should be strictly comparable with that of 1891. In the case of ten Corporations and Local Boards, owning the district gas-works and working up their own gas liquor, the make was less than that of 1891; the percentage difference being, however, small. Still, the increase in the coal carbonized for gas manufacture would not appear to have proceeded in the ratio of former years. The total quantity of ammoniacal liquor distilled was equivalent to 24,725 tons of sulphate, as against 24,700 tons in 1891; the proportion manufactured into sulphate being 83 per cent., against 85·3 per cent. in 1891. The proportion manufactured into the various forms of liquor ammonia, including the crude liquor ammonia for use in ammonia-soda works, increased from 12·4 to 15 per cent. of the total. But little change has taken place in the methods of dealing with the foul gases evolved in the manufacture of sulphate. In 33 per cent. of the total, the gases pass to the sulphuric acid chambers after combustion; in 9·7 per cent., the Claus process is used; in 52·3 per cent., the sulphuretted hydrogen is dealt with by oxide of iron; and in 5 per cent., the gases are treated by other methods. These figures differ very little from those of recent years. Plant of continuous type for the distillation of the liquor is now almost universally employed (only 6·3 per cent. of sulphate being made by plant of the intermittent type). Its use is also extending to works making crude concentrated liquor ammonia, for which it has obvious advantages.

Mr. E. Jackson's report on the South Midland district contains much interesting matter. He has under his supervision 3 gas liquor or liquid ammonia works, 66 sulphate of ammonia works, and 2 muriate of ammonia works. In eight works the sulphuretted hydrogen is still burnt to produce oil of vitriol. The sulphuretted hydrogen from 45 per cent. of the gas liquor produced in the district is utilized in this way. At one works this plan has now been in operation sufficiently long to allow of a reliable estimate being formed as to the amount of vitriol saved during the year by adopting this method of treating the sulphuretted hydrogen; and an additional yield of 200 tons of sulphuric acid for twelve months is the result. All this was formerly sent into the air. In the four works using the Claus apparatus for dealing with the sulphuretted hydrogen, the year's working has confirmed the advantages of this method for a large make of sulphate of ammonia, and where there is no sulphuric acid plant attached. At one works, the chambers in which the sulphur is deposited had to to be enlarged, as the finely-divided sulphur passed into the limestone tower and choked it. It is interesting to note that at one of the largest works where oxide purification has to be used, owing to the intermittent method of distillation being employed, 150 tons of spent oxide have been sold this year, containing 58 per cent. of sulphur; and on this account there has been no difficulty in disposing of it. Unfortunately, it is not always easy to persuade the sulphuric acid maker to take spent oxide from ammonia works, as it is frequently considered unadvisable to return to the purifiers when charged with from 40 to 45 per cent. of sulphur. In this particular case, very large purifiers are employed, each containing from 70 to 80 tons of oxide. A probable explanation of this result may be found in the fact that the oxides of different strengths are kept separate, and that those which are most lightly charged with sulphur are placed on the top of the purifiers. Referring to the additional works and processes coming under inspection in pursuance of the provisions of the new Act, Mr. Jackson makes the following remarks on the subject of tar-works. "There are two fertile sources of nuisance from this class of works—viz., (1) the uncondensed hydrocarbons and sulphuretted hydrogen escaping from the receivers during the distillation of the tar; (2) the whitish irritating vapours given off from the hot pitch as it runs from the still. With regard to the first class of noxious gases, in some works they are drawn away from the receivers either by a steam jet or a small pump through a water-seal, and pass into or under the boiler fire. In one works, the sulphuretted hydrogen is absorbed by means of oxide of iron, as in sulphate of ammonia manufacture. I have to remark here, however, that in many works I have already visited, no provision whatever is made for dealing with the offensive gases; but they are allowed to escape into the air. As to the second point—the whitish vapours from the hot pitch—which constitutes another source of considerable nuisance in the vicinity of tar-works, by the diffusion of hydrocarbon vapours when the pitch is run off too hot, with the result that a perfect deluge of these whitish extremely irritating fumes escape, and travel a considerable distance outside the works, in some works I find that the pitch is run off from the stills directly into the open pitch bay. In others it is run into a covered vessel, usually of iron, sometimes of brickwork, where it is allowed to cool somewhat before running into the bay; but this alone is not sufficient to prevent the nuisance complained of, although, if allowed to remain long enough, it may be said to diminish it to some extent. It can, however, only be allowed to cool in these vessels down to the point at which it will run into the bay. It may be remarked here that the air expelled from these coolers when the hot pitch is run in requires to be dealt with, as it is very offensive—being charged with vapours from the pitch. It might appear that the cooling could be done to a large extent in the still; but it is most important that the pitch should be perfectly liquid when run off, so that the still may be completely emptied, to prevent scaling. In some instances steam is introduced before finishing the charge; and in other cases, the pitch is also softened in the still by the introduction of creosote oil. In other works, a further step is taken by the erection of a shed or pitch-house over the bay; but in many cases I find that these houses are by no means tight, and the vapours escape through crevices in the roof and sides, and through loosely-fitting doors. In several works the pitch-house is really efficacious, being absolutely tight; so that, when the pitch is run off from the cooler, no nuisance is observed. When the pitch has ceased giving off further vapours, the doors are opened to allow more rapid cooling. By the adoption of closed vessels, in addition to the stoppage of the nuisance, the pitch is, I am informed, improved in quality by the retention of these volatile compounds. It will be observed that, where a number of stills are employed, one such covered bay is of little use, but there should be several, unless all the stills can be run off at one particular time of the day, when all doors can be closed. At one works, where there are eight tar-stills, the pitch-house is most substantially and carefully built, and is divided into five compartments, each being capable of being shut off completely by tight-fitting doors. Another plan of running off the pitch remains to be described. It is commonly known as the French plan—having been adopted for some time at the Paris Gas-Works; and it is in use in several works in this district. The pitch from the still is run into an intermediate cooler, thence into a pit or chamber built some 7 or 10 feet in the ground. This chamber or receiver usually runs the entire length of the range of stills. By remaining here, much of the vapour is condensed. The pitch in the pit is kept liquid from the running off of one still to the discharge of the next; and it can only find its way out from the bottom of the pit—the cooler or tough pitch being forced over the weir by the running off of another still into the pit."

In the district under the supervision of Dr. A. C. Fryer, there are 70 works registered where the manufacture of muriate and sulphate of ammonia is carried on; and these produced 6980 tons of ammonia salts during the past year. The average of the oxide of iron purifiers in this district shows that 83 cubic feet of oxide, occupying 55 square feet of area, are being employed per ton of sulphate made per week. Several works have two purifiers when the process is continuous; one being kept ready filled with fresh oxide, and used as soon as the first shows signs of becoming foul. Dr. Fryer mentions that Mr. C. Stafford Ellery, Manager of the Bath Gas-Works, has invented an ingenious form of saturator, which is so constructed that the sulphate settles to the lowest part of the funnel-shaped bottom, where a special valve is fitted to draw off the salt as it is precipitated.

Since 1887, the south-eastern counties, known as district No. 7 under the Alkali Act, have been divided into two portions. Those counties north of the Thames (seven in number) have hitherto been under Mr. Sutton's charge and inspection; while the three counties south of the Thames have been under the care of Mr. Brereton Todd. Owing to Mr. Todd's retirement, and the subsequent appointment of Mr. Sutton as Inspector, the two divisions were again united to form one district as originally. The large increase in the number of works to be inspected has necessitated less frequent visits to individual works than have perhaps hitherto been made; but in the case of the more important works from which the escape of acid gases is limited by the Act, endeavour has been made to visit these at least once a month—the actual number of visits averaging 11·3 per works. During the past year, Mr. Sutton had the assistance of Mr. E. M. Fletcher in carrying out the duties of inspection; his help being more particularly devoted to the works south of the Thames. There were 866 visits to works—190 by Mr. Fletcher, and 676 by Mr. Sutton; and 603 analytical tests were made of gases escaping from chimneys and flues, 70 of which were carried out by Mr. Fletcher. The number of registered works under inspection during the year was 204; the separate manufacturing processes under supervision amounting to 256. The gas liquor and sulphate of ammmonia works include those which manufacture sulphate and carbonate of ammonia, liquid (refined) and anhydrous ammonia from gas liquor. The large number of 80 works are registered for one or another of these processes in this district; but the majority confine themselves to the manufacture of sulphate. The total quantity of ammonia manufactured during the year amounted to 39,379 tons, calculated as sulphate of ammonia. Two new works of this class were registered during the year; both being small gas-works. Mr. Sutton makes the following interesting remarks: "The effectual disposal of the sulphuretted hydrogen evolved during the treatment of the gas liquor is the main point in the manufacture with which the Act is concerned. Four different modes of treatment are available; and these may be enumerated in order of preference as follows: (1) Direct utilization for vitriol manufacture; (2) recovery of the sulphur by the Claus process; (3) absorption in hydrated oxide of iron; and (4) burning. Of the sulphuretted hydrogen evolved in this district, 60·3 per cent. is utilized for sulphuric acid making, 10·8 per cent. is treated for the recovery of the sulphur as brimstone, 9·9 per cent. is absorbed in oxide of iron, and the remaining 19 per cent. is burnt into sulphurous acid, and escapes from the chimneys as such. No comparison can be made between these percentage figures and those given in last year's report, on account of the present district being of much wider area, and now including the works in Kent, Surrey, and Sussex. Very considerable alterations will be necessary in the treatment of the foul gases evolved in many of the works in the

southern portion of the district. The unsatisfactory method of burning the gas is largely in use, even in some cases where the sulphuretted hydrogen could be easily and profitably used in the manufacture of sulphuric acid. Definite promises have been obtained in the case of the chief offenders in this particular that the desired alterations shall be carried out during the course of next summer. If these are accomplished, the high percentage of gas now burnt will be materially reduced. Several instances have been met with where the foul gas was ostensibly absorbed in oxide purifiers, but where it was actually burnt. This method, no doubt, had been resorted to on account of the small purifying space at command. Pressure has been brought to bear on these cases to revert to the former mode of treatment; and, where necessary, improved cooling and purifying plant will be added. No case of actual escape of sulphuretted hydrogen in the chimney gases has been noticed; but doubtful cases have been submitted to careful tests, with a view to prove if perfect combustion occurred. The apparent small quantity of sulphuretted hydrogen treated in oxide purifiers (9·9 per cent.) is somewhat misleading, for no less than 52 out of the 80 works have adopted this method. It will therefore be seen that this mode of treatment is popular with the smaller works, and it is eminently suitable in such cases. When, however, the quantity of sulphuretted hydrogen to be dealt with is considerable, but not sufficient to be treated by the sulphur-recovery process—that is to say, where the quantity of sulphate made ranges between 80 and 250 tons per annum—the absorption of the gas in oxide of iron becomes somewhat troublesome and expensive, on account of the labour entailed in the frequent recharging of the purifiers. Several complaints to this effect have been made; but this difficulty could, I feel sure, be largely minimized if the practice of revivification *in situ* were more generally adopted. In the few cases where this is successfully accomplished, the life of the oxide has been materially prolonged. Many attempts have been made; but, owing to the use of an excessive quantity of air, or to the wrong manner of its application, a too rapid oxidation has resulted, and further attempts have been abandoned. Some careful experiments on this subject are being carried out at one of the works; and I hope next year to be able to give some particulars of the results, which may be of general interest and utility. When sulphuretted hydrogen has been utilized for sulphuric acid making, this has been successfully accomplished; and very large quantities of acid are produced from this source at one works, and the manufacture has again been very successfully carried on throughout the year. Another works followed in this direction during the year, and the absorption of the sulphuretted hydrogen in oxide has been discarded for the more direct method of burning the gas in the pyrites kilns attached to the sulphuric acid plant. The results have been most satisfactory; and the purifiers will only be used in future if it should be necessary at any time to stop the acid plant. It is the intention in two other cases to adopt this plan as soon as the necessary arrangements to plant can be made. The Claus-recovery process has been in use throughout the year at five works. Four of the plants belong to gas companies, and one is owned by a private firm. In the latter case, considerable difficulty is experienced in obtaining a well-balanced limited oxidation, as the liquor is obtained from many sources, and differs greatly in character. In every case the plant has given satisfactory results; and considerable quantities of sulphur have been recovered. The waste gases leaving the depositing chambers have been effectually treated in limestone towers and oxide purifiers for the extraction of the sulphurous acid and sulphuretted hydrogen invariably present. As a rule, the gases have been found to contain a larger proportion of acid than is consistent with the best results; but this has been brought about by the imperfect system in use for testing the gases. Those in charge apparently have instructions to test from time to time with litmus and lead acetate papers, and so to regulate the air supply that a certain shade of brown discoloration shall be obtained on the lead paper. Such rough qualitative tests are of little use by themselves, and are frequently misleading. I have sometimes found as much as 30 grains of sulphurous acid per cubic foot of gases leaving the chambers when the kiln reaction has been shown by the test-papers to be working well. Much better results would be obtained if some simple method for the quantitative estimation of both the sulphuretted hydrogen and carbonic acid were used, such as is customary in the North for testing the mixed gases leaving the Claus chambers in the Chance-Claus process. The average quantity of acid leaving the absorbing (limestone) towers and passing in with the sulphuretted hydrogen to the oxide purifiers has been found to be 1·72 grain per cubic foot; but it has occasionally largely exceeded this figure. When such has been the case, the absorbing power of the oxide has been injuriously affected, and the oxide does not readily re-oxidize when exposed and turned over for the purpose. If, however, one-sixth part of dry slaked lime be mixed with the damaged oxide, oxidation rapidly ensues, and revivification becomes complete. The admixture of lime also acts beneficially when the oxide is again placed in the purifier, by reason of its neutralizing power on any sulphurous acid which may again pass into the purifier along with the sulphuretted hydrogen. The chimneys in connection with the boiler fires or special kilns in which the foul saturator gases are burnt have been regularly tested both for the presence of unconsumed sulphuretted hydrogen and for the total acid compounds evolved from the combustion of the sulphuretted hydrogen and the sulphur compounds in the fuel. In no case has sulphuretted hydrogen been detected; and the average total acidity of the chimney gases is 1·55 grains of sulphur trioxide per cubic foot. There were two complaints of nuisance arising from sulphate of ammonia works during the year. In one case (that of a small provincial gas-works), some foundation existed for complaint. This chiefly arose from the purifiers attached to the gas-making plant; but the sulphate plant may have been contributory, as it was at the time undergoing alterations which had been delayed by the death of the Manager, and the subsequent appointment of a successor. In the meantime it was necessary to deal with the accumulation of gas liquor and the distillation process was started before the alterations had been satisfactorily completed. The other complaint concerned a large London gas-works, at which the manufacture of sulphate had somewhat recently been started. This has led to an action in the High Court of Chancery; and the case is still *sub judice*."

In the portion of the report relating to Scotland, the Chief Inspector records a continued increase in the production of sulphate of ammonia. In his report for 1891, Mr. Fletcher alluded to the great development of this industry in the iron-smelting works. There the waste gases of the blast-furnaces, which formerly were allowed to burn uselessly, are now, he says, collected and exposed, first to a scrubbing process, whereby the ammoniacal and tarry portions are removed, then to burning in furnaces used for heating the blast. Some of the gas is also burnt under the boilers which drive the blast-engines. The ammonia and tar thus saved form now important items in estimating the profit and loss account of the whole works. The amount of ammonia collected in a similar method in the gas-works is also continually on the increase. The interest felt in thus watching the growth of the ammonia industry is the greater when it is borne in mind that all the ammonia of commerce is obtained thus as a bye-product of other industries. There is no method yet known by which it can be economically produced by any direct act of manufacture.

A NEW PUMPING-ENGINE AT THE WIDNES WATER-WORKS.

The Gas and Water Engineer of the Widnes Corporation (Mr. Isaac Carr) has lately presented to his Committee a report on the trial of the new pumping-engine—the "Benjamin Brown"—which has been erected at the Netherley extension of the water-works. It has done such excellent duty that a few particulars from the report may be of interest to those of our readers who, like Mr. Carr, have water as well as gas works under their charge.

The engine was designed by Mr. H. Davey, M.Inst.C.E., of Westminster, and was built under his patents by Messrs. Hathorn, Davey, and Co., Leeds. It is a compound engine, having 32-inch and 60-inch cylinders and a 6 ft. 3 in. stroke. It works two sets of pumps. There are two 18½-inch lift-pumps in the bore-holes, with 6 ft. 6 in. stroke; and they deliver the water into a sump under the engine-room floor, from which a double-acting piston force pump, 18½ inches in diameter and 6 ft. 3 in. stroke, takes the water and forces it to the reservoirs. The final trial of the engine and pumps was commenced at 12.15 p.m. on the 7th of June, and concluded at 12.15 p.m. on the 9th—a period of 48 hours. The engine was required by the Corporation to do a duty of 90,000,000 foot-pounds of work on 1008 lbs. of steam, which is equal to 90,000,000 foot-pounds on 112 lbs. of coal, evaporating 9 lbs. of water per pound. The penalty under the contract was £50 for each million of duty below the specified number; while a premium of £25 was offered for each million in excess of the duty. The engine is provided with a surface condenser, into which all the steam used is condensed, with the exception of that condensed in the steam-jackets, which is discharged through a trap. The condensed steam was measured from time to time, during the 48 hours, in tanks, the capacity of which had been previously ascertained by actual measurement. The method of trial was such that leakages would make the duty appear lower than it actually was, because all leakage went into the measuring tanks, and therefore was debited against the engine. The contractors were represented by their Mr. Davey; the Corporation, by Mr. Carr. These gentlemen were present during the whole time of taking the measurements; and they occasionally verified the readings. The following are the results of the trial: The first measurement was continued for 6h. 5m., the result being a duty of 112,700,000 foot-pounds on 112 pounds of coal, evaporating 9 lbs. of water per pound; the second was continued for six hours, with a result of 109,100,000 foot-pounds; the third, for three hours, with a result of 106,000,000 foot-pounds. The average duty was therefore 1644 ÷ 15 = 109,600,000 foot-pounds, against 90,000,000 specified. The following are some additional figures relating to the trial: Indicated horse power per hour, 229·8; pump horse power per hour, 200; steam used per indicated horse power per hour, 15·8 lbs.; do. per pump horse power, 18·22; coal used per indicated horse power, 1·75 lbs.; do. per pump horse power, 2·02 lbs.; mechanical efficiency of engine, 87 per cent. The following are Mr. Carr's observations on the trial: The boiler pressure was 73·53 lbs.; the vacuum, 27·29 inches; the temperature of the water from the condenser, 95° Fahr.; height of lift of water by the well pump, 95 feet; do. by the force pump, 266 feet; quantity of water pumped per stroke per minute by the well pump, 151 gallons; by the force pump, 142 gallons. The foregoing figures apply to the three tests; those which follow apply to them separately: Engine counter readings: First test (6h. 5m.), 778,221 and 782,855; second test (6h.), 793,564 and 798,090; third test (3h.), 808,918 and 811,170. Strokes made: First test, 4634; second test, 4526; third test, 2252. Strokes made per minute: First test, 12·69; second test, 12·57; third test, 12·51. Water pumped into reservoir: First test, 658,028 gallons; second test, 642,692 gallons; third test, 319,784 gallons. Average total feed water from condenser, including jackets, in 15h. 5m.: First test, 21,600 lbs.; second test, 21,790 lbs.; third test, 11,160 lbs. Mr. Carr concluded his report as follows: "On the foregoing results, the contractors, having exceeded the specified duty by (say) 19,500,000 foot-pounds, are now entitled, under the terms of the contract, at £25 per million, to the sum of £487 10s. premium. The contract speed of the engine was 11 strokes per minute and 2,250,000 gallons per diem. The actual average speed, during the whole of the trial, was 12·54 strokes per minute, pumping 2,566,000 gallons per diem, or 14·4 per cent. in excess of the contract quantity. The maximum rate of speed was 13¾ strokes per minute, 2,740,000 gallons per diem, or 20·4 per cent. over the contract speed. When running at this latter rate, the working was smooth and free from shock; so that this rate might, with perfect safety, be continued whenever occasion should demand it. At the time the tender of Messrs. Hathorn, Davey, and Co. was accepted, it was stated by Mr. Brown, then the Chairman of this Committee, that the saving on the fuel account alone would pay good interest on the capital expended. The actual result is that the new engine will pump double the quantity of water pumped by the 'James Cross' engine without any increase in the quantity of fuel. This represents an annual saving in the coal bill alone, on last year's price, of £750, or 13 per cent. on the cost of the engine and pumps and 9·6 per cent. on the total cost of the whole scheme—*i.e.*, £9726. In

addition to this, there will be a large profit on the extra water sold." Mr. Carr's report of the water delivered in 28 days in June, which accompanied the engine report, showed that the consumption was 89,825,000 gallons, or 96,241,000 gallons for the month. This was considerably in excess of any previous record, and also of his previous pumping capacity; so that, as he pointed out, but for the opportune completion of the new scheme, the town would last month have suffered from shortness of water. When the reports came before the Corporation, the Chairman of the Committee (Mr. Alderman Timmis) remarked that it was a matter for great congratulation that the new engine had exceeded the stipulated power. Mr. Bullough stated that he had watched the tests on behalf of the Committee, and he could congratulate them and the Council upon their successful issue. He thought they ought also to congratulate the Engineer upon the way in which he had carried out the work. It was a very successful thing for the town generally. The Mayor (Mr. Alderman Gossage) likewise expressed his pleasure at the satisfactory working of the engine.

METROPOLIS WATER SUPPLY.

The Quality of the Water in the Month of June.

The returns furnished to the Registrar-General by the London Water Companies as to the water supply of the Metropolis during the month of June show that the average daily supply was 214,697,790 gallons, as compared with 196,841,885 gallons in the corresponding month of 1892. The number of services being 795,436, the rate was 270 gallons per service. Of the entire bulk of water sent out, 108,736,018 gallons were drawn from the Thames, and 105,961,772 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: "Taking the average amount of organic impurity in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: Kent, 0·5; New River and Tottenham, 1·3; East London (deep well), 1·6; Colne Valley, 2·2; East London (river supply), 1·9; Chelsea, 2·3; West Middlesex, Southwark, and Grand Junction, 2·5; and Lambeth, 2·7. The unfiltered river waters contained the following proportions: New River Cut, 2·1; East London Company's intake, 4·4; and the Thames at Hampton, 4·7. The Thames at Hampton was, on June 20, pale yellow in colour, and turbid. It was chemically very inferior, and bacterially slightly inferior to its condition on the 16th of May. Contrasted with unfiltered water, the supplies of the five Companies drawing from the Thames showed great chemical, and the following percentage of bacterial, improvement: Chelsea, 98·71; West Middlesex, 99·64; Southwark, (filter No. 2) 99·43, (filter No. 4) 99·28, (gravel water) 99; Grand Junction, (Hampton filters) 87·09, (Kew general filter) 35·95, (Kew, South, filter-well) 98·85; and Lambeth, 98·49. The water was in all cases efficiently filtered. The unfiltered water taken chiefly from the River Lea by the New River Company on June 22 was turbid and very pale yellow. It was neither chemically nor bacterially of quite so good quality as on May 18. Before being supplied, it was improved bacterially to the extent of 98·32 per cent. and ranked, as regards chemical purity, with the deep-well waters. It was efficiently filtered before delivery. The raw water taken from the Lea by the East London Company on June 22 was turbid and pale yellow. It was, both bacterially and chemically, of much worse quality than when last examined on May 18; but it was efficiently filtered and improved before delivery—chemically by more than 50 per cent., and bacterially, on the average, by 99 per cent. The deep-well waters of the Kent, Colne Valley, and East London Companies and of the Tottenham Board of Health were of excellent quality for dietetic purposes; the Kent Company's water being again distinguished by its very high degree of organic purity. All these waters were clear and bright without filtration; and that of the Colne Valley Company was softened before delivery, and thus rendered suitable for washing. Seen through a stratum 2 feet deep, the Kent, Colne Valley, Tottenham, and East London (deep-well) waters were clear and colourless; the New River and East London (river supply), clear and nearly colourless; and the remaining waters, clear and very pale yellow. The bacteriological examination, by Dr. Koch's process, of the raw river and gravel water, and of those supplied by the various Companies, collected on the 20th, 21st, 22nd, and 23rd, gave the results contained in the following table:—

	No. of Microbe Colonies per Cubic Centimetre.	Temperature in Deg. C.
Raw River Waters.		
Thames at Hampton	2789	20·4
New River Cut	2079	15·8
Lea at Angel Road	4184	19·7
„ after storeage	1369	19·4
River Supplies.		
Chelsea	36	20·0
West Middlesex	10	19·0
Southwark, No. 2 Well	16	21·3
„ No. 4 „	20	20·5
„ gravel water	28	16·5
Grand Junction, Hampton filters	360	20·9
„ „ Kew general filter well	392	19·4
„ „ Kew south „ „	32	20·0
Lambeth	70	20·9
New River main filter shaft	35	18·4
East London, No. 1, Essex Well	61	18·3
„ „ No. 11, filter	35	19·7
„ „ No. 12, „	21	17·8
Deep Well.		
Kent	48	11·2

Thus, of the filtered waters, the West Middlesex and Southwark Companies delivered water of the greatest bacterial purity; while two out of the three filters examined at the works of the Grand Junction Company were allowing an abnormal number of microbes to pass. The Kent Company's water also contained, for deep-well water, an unusually high number."

In the course of their report to the Official Water Examiner (General A. de Courcy Scott, R.A.), Messrs. Crookes and Odling say: "The quality of the water supply during June has been very good, and bears a close relationship to that of the supply during May. Towards the end of the month, the long drought began to break; but the rainfall was too insignificant in quantity to make itself apparent in the composition of the waters. During June, the average rainfall for Oxford, taking a mean of 25 years, is 2·21 inches; whereas the rainfall during the past June has only been 0·77 inch—showing a deficiency of 1·44 inch. Most of this fall took place during the latter part of the month. In our report for May, we drew attention to the steady and appreciable decrease in the proportions of common salt, oxidized nitrogen, and hardness of the Thames-derived waters. The following table shows that the supposed deterioration in quality of the river water, consequent on the greatly deficient rainfall and high temperature, has no foundation in fact; the increased activity of fluviatile vegetation more than counteracting any slight excess of mineral matter which might theoretically be present.

1893.	Common Salt per Gallon.	Nitric Acid per Gallon.	Degrees of Hardness per Gallon.
March	2·167	0·931	16·80
April	2·181	0·888	15·11
May	2·196	0·611	14·66
June	2·132	0·601	14·74

The organic carbon and the oxygen required for oxidation were practically the same as in the two previous months; the difference showing an excess only in the third place of decimals. The turbidity, or dull appearance, which has been recorded in five of the samples supplied by the Grand Junction Water Company was due to suspended clay particles, and is accounted for by temporary local disturbances in the mains resulting from the fixing of fire hydrants, in accordance with the requirements of the London County Council. The turbidity was only local; samples from the works on these days being perfectly clear. With these exceptions, all the samples were well filtered, clear, and bright."

A Gadd and Mason Columnless Gasholder for Chester.—The Chester Corporation have decided to erect a columnless holder at their gas-works, and have placed the order for it with Messrs. R. and J. Dempster, of Manchester. It will be a three-lift, 100 feet in diameter and 24 feet deep; and the spiral guides will be placed externally. Messrs. R. and J. Dempster have also obtained the order for a steel tank, 102 feet in diameter and 24 ft. 6 in. deep, for the holder to work in.

The Huddersfield Electric Lighting Scheme.—The latest of the new public works undertaken by the Huddersfield Corporation—those for the supply of the electric light in the borough—are expected to be brought into operation at the end of October. They are located near the gas-works; and they will be capable of containing generating machinery equal to the supply of 20,000 lamps of 16-candle power, together with reserve plant. The machinery already installed will provide for 9000 8-candle lights; but it has been found necessary to double its capacity in order to meet the unexpected demand for the supply of electricity. The length of the primary mains laid is rather over 3000 yards; and low-tension mains have been put down to the extent of 6000 yards. The charge will be at the rate of 6d. per Board of Trade unit.

Slandering a Gas Company.—A case was before Lord Chief Justice Coleridge at the Yorkshire Summer Assizes last Friday, in which the plaintiffs were the Heckmondwike Gas Company and the Directors, and the defendant was Thomas Redfearn, a member of the Local Board. Mr. Tindal Atkinson, Q.C., who appeared for the plaintiffs, stated that for a little time past an agitation had been going on in Heckmondwike for the electric light; and the defendant had taken an active part in favour of the agitation to light the town in that way. On two occasions—once at a public meeting, and again at a meeting of the Local Board—the defendant made serious statements against the way in which the Gas Company was managed, and also as to the Directors' attempts, as he suggested, to rob the ratepayers. On Sept. 19, 1892, at a public meeting, he said the Directors had thrown the ratepayers' money away maliciously; and on Jan. 16, in the present year, speaking at a meeting of the Local Board, he said "he had no hesitation in saying that the Gas Company Directors or Managers were robbing the townspeople. They could stand and rob them; and though they knew they were doing it, they could do nothing. It was a fair robbing concern." Defendant added, though this was not defamatory, "They will never make us believe the Directors are Christians." The plaintiff Company were, like all other gas companies, limited to a certain dividend; and after earning this they had to reduce the price of gas. The allegation was that his clients were unlawfully and improperly keeping up the price of gas, and in this sense were robbing the ratepayers. Mr. Kershaw, for the defendant, urged that the Company had no right of action. A Company could not, as such, commit a crime; and therefore could not be defamed. As to the Directors, his client never had from the beginning any intention to put any imputation on the plaintiff Company or the individual Directors that they had done anything which they ought not to have done in the way of a criminal offence. Mr. J. Stead, one of the Directors, was then put into the box; but his examination had scarcely commenced when Mr. Atkinson announced that the case had been settled. Mr. Kershaw stated that they had come to an agreement which was satisfactory to both parties. They had arranged that there should be a verdict for the plaintiffs for forty shillings, and that a certain sum should be paid by way of costs. In addition to this, he desired to say, on behalf of the defendant, that he never intended to charge the Directors, whatever the language might appear to convey, with any such offence as the statement of claim set forth: and, if it had appeared to anyone that he had so charged them, he unreservedly withdrew all imputations.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Everyone who was present at the meeting of the North British Association of Gas Managers at Dundee this week must have returned home gratified at the success of the gathering. Last year the Association had a big event on, in the unveiling of the bust of Murdoch, which made the Stirling meeting one of more than usual interest. It would, therefore, not have been at all to be wondered at if the Dundee meeting should have exhibited somewhat of a decline from the height which was attained at Stirling. But instead of a decline, there was a further ascent, both in the number who were present and in the quality of the proceedings, as well, also, as in the large number who joined the Association this year. Of course, one reason for the augmented interest in the Association was the promulgation of the Peebles process of oil-gas making—a subject which has arisen during the year, and which, on account of the possibilities it opens up of both bettering and cheapening gas, is a matter of profound interest to all gas managers who are struggling to keep up a high illuminating power, and who have in their recollection how they have been punished by coal merchants in the past two years. It must be said that, when the interest which has been manifested in the process is taken into account, the communications made to the meeting by Mr. Young and Mr. Bell were not of the satisfying character which might have been expected. It was in the nature of things that Mr. Young's paper should be of an abstract sort, which probably most of the members would not understand without having leisure to consider it; but in Mr. Bell's communication it was expected that a fuller statement would have been made as to the results of the working with different qualities of oil, and, as some of the members expressed, as to the cost of working. There was certainly sufficient to indicate the direction in which the working went; but it was not backed up by tables of exact figures of actual results, which are the things the manager of serious mind delights in, and such as were given to some extent by Mr. Yuill, of Alloa, at the Informal Meeting in April, and by Mr. Linton, of Leith, and Mr. Mitchell, of Edinburgh, in their most exhaustive reports. True, many things have happened since the invention was first brought under the notice of gas managers—or they are happening; and there was probably a desire not to go too fully into matters in the meantime. It is just possible, too, that it was the best policy not to put a great deal forward, seeing that at present the process is being introduced into so many works, and that by this time next year there will be a volume of experience by others than the inventors, which will, being independent, be of more value than their testimony. As it was, the most interesting portion of the day's proceedings was Mr. Young's replies to the various questions and criticisms which were given expression to during the discussion. Mr. Young in these showed himself to be a perfect master of the subject; and those who ventured to put forward doubts must, when he sat down, have felt that they either had done a service in bringing out the information, or that they had had a fall that they did not reckon upon. Mr. Keillor's "Notes on Prepayment Meters" was a well-reasoned essay in favour of the use of these appliances; and it brought out some interesting and valuable information. Mr. Ballantyne's communication upon "Cooking by Gas" was also a meritorious exposition of the advantages, to the gas producer, of the use of these domestic helps; and the value of it was enhanced by the concrete instances which Mr. Ballantyne was able to cite. The subject is one which requires light thrown upon it by the explanation of actual working. There has been a disposition to hesitate in pushing the adoption of gas cooking in places where gas is not cheap, on account of the notion that it would necessarily be costly. That this is not well founded requires to be shown by demonstration; and the demonstration needed is not that of the lecture platform, but the continuous and varied experience of housewives in the management of cookers, and of gas managers in supplying gas for them. This was what Mr. Ballantyne to a certain extent supplied; but as one swallow does not make a summer, and one paper cannot prove so general a proposition as the one under review, the effect of Mr. Ballantyne's paper can only be but as a drop in the bucket. At the same time, a drop in the bucket is in the right direction; and though the misfortune happened that there was not time to discuss the paper, there may not be any loss upon that account to the gas industry, as it is to be taken up next year. By this time, others may, by his example, have been led to cultivate a spirit of liberalism, without which success in stove hiring cannot be attained, and so may have something to say which they could not have stated on this occasion. The only other paper which was read before the meeting was Mr. D. M. Nelson's on the "Yeadon Process of Gas Manufacture." Mr. Nelson has taken up the Yeadon retort as if it were his own; and he advocates it in the most discreet and disinterested fashion. It is certainly a misfortune, in connection with the divulging of a new process of so much merit as the Yeadon retort is shown by Mr. Nelson to be, that it has not been brought practically into use. There has been sufficient time to have had it fixed up in some works and kept going continuously, so as to afford reliable and independent data as to its results; but this has not been done, and gas managers are asked to accept data obtained by the working of one experimental retort. The retort, it may be admitted, works wonders, and plays havoc with many preconceived notions of retorting; but there is all the more reason, on that account, why it should be at once brought into practice, and that gas managers should not be asked to take it for granted that it is a wonderful production. To take the analogy of the Young process, it may be pointed out that Mr. Young experimented for a considerable time, in the knowledge of some who helped him to keep his secret, and that it was only after he had started it in practical working at Peebles that he allowed a representative of the JOURNAL to publish it. Why cannot the proprietors of the Yeadon retort have plant fitted up in some works, and run continuously—a careful record being kept of its working—and then make it plain to everybody what it is capable of doing? The present policy the proprietors of the Yeadon process are pursuing is simply to allow other processes to occupy the field before them; and by the time they wake up, if they are not sharp about it, they will find that they have lost their market. Mr. Nelson did his best, and gave a lucid description of the retort and its working; but so long as he could only speak of an experimental affair, he could not expect to make the impression which he desired. If the Yeadon retort were brought into practical use, and produced the results it has given in the experimental stage, it has possibilities in front of it which no other system of retorting could, to use a trite expression, "hold a candle to;" and there is therefore all the greater reason why its supporters should come out and show what it is capable of doing in every-day working. With this criticism, which, like Mr. Nelson's remarks on the Young process, is intended to be of the most friendly description, this notice must end. I will only add that the meeting at Dundee on Thursday was a credit to the North British Association, and express the hope that future assemblies will maintain the high standard which the last two meetings of the Association have attained. Mr. Hall made an excellent President. In his address, he wisely did not attempt to grapple with problems of the "infinite" order, which some impossibly "yearn" after, but contented himself with a plain and practical dissertation upon things as they are to be found; and on these he talked with a common-sense and candour which showed that he is an attentive observer of all that goes on in the gas world, and a deep thinker upon every one of the problems which are at present engaging the attention of the technical side of the world of gas supply. His management of the meeting was all that could be desired—everything passing off like clockwork, and nothing being suppressed which it was in the interest of the members to have divulged. In this respect, he was an ideal chairman, and set an example which doubtless his successors in office will copy. Mention should, perhaps, also be made here of the careful way in which everything pertaining to his office was arranged and looked after by Mr. R. S. Carlow, the Secretary. Mr. Carlow is a hard-working Secretary, who, it may be stated frankly, bestows more care upon his work than the members could demand; but he has, as he stated himself, his reward in the increasing interest which the members take in the work of the Association. It will be a pity if, as I understand he is threatening to do, he should seek to retire from the office.

Mr. W. Young, of Peebles, has transferred his interest in the oil-gas process which he has invented, to a limited liability Company, which was registered in Edinburgh this week. The Company is named the Oil Gas Enrichment Company, and has a capital of £30,000, divided into shares of £1 each; and it is described as being formed to acquire and work the invention of "improvements in the decomposition of mineral oils for the production of illuminating gas," for which a patent has been applied in favour of William Young, of Priorsford, Peebles, and Alexander Bell, Manager of the Peebles Gas-Works. The signatories to the application for registration were James Milne, Engineer, Milton House Works, Edinburgh; George Harrison, Merchant, Edinburgh; George T. Beilby, Consulting Chemist, Slatefford, Mid-Lothian; Wm. Young, Chemical Engineer, Peebles; John Fyfe, Managing-Director, Young's Paraffin Light and Mineral Oil-Company, Limited, Glasgow; Alexander Watt, Solicitor, Glasgow; and J. Gordon Mason, S.S.C., Edinburgh. The registered office of the Company is at 28, Queen Street, Edinburgh. Of the capital, 20,000 shares are preferred, and 10,000 deferred.

It is officially announced that the Sub-Committee of the Gas Committee of the Glasgow Town Council have resolved to recommend that the price of gas should be reduced from 2s. 9d. to 2s. 6d. per 1000 cubic feet, at which figure it stood before the rise of last year. This resolution, it is said, has been come to in view of the favourable state of the accounts—arising chiefly from the lower prices which were paid for coal during the year, by which there was a saving of about £40,000. This is satisfactory. The question of a further reduction next year will depend on the outcome of what may be called the race between the large capital outlay which the Corporation have been going in for, and the gain to be derived from the mechanical appliances which Mr. Foulis is introducing so largely. Any further reductions must be dependent on their working.

Those of your readers who take an interest in large gasholders, will be pleased to learn that the 6 million cubic feet holder which the Glasgow Corporation have erected at their Temple Farm station has now been completed. When the company of gas managers who assembled to take part at the Informal Meeting in April last visited the holder, Mr. R. Laidlaw, the head of the Barrowfield Iron Company, of Glasgow, who were the contractors for the construction of the ironwork, stated that with good weather he expected they would be able to finish the holder in about two months. This estimate has been almost accomplished, as the work has been completed in about three months. At present the holder is being blown up to test its working capacity; and this, so far, has been found to be all that could be desired. The great shell is rising as straight as a bell—the lifts keeping perfectly true in position, and the pulleys fitting closely to the guide-rails. The Corporation have gone in for no experiments in rope or other guides, but have adhered to the old method of guiding by rigid pillars—in this case, of steel lattice-work—which go right to the top. The tank and holder are both remarkable instances of rapidity of construction. It was only in October, 1891, that Mr. R. M'Alpine, the contractor for the excavation of the tank, began his operations; and though there were 200,000 tons of material to handle, he completed his work in ten months. It is little more than a year since the Barrowfield Iron Company came on the ground to put up the ironwork; and the actual construction has occupied only since September of last year. The guide-framing was sub-let to Sir William Arrol's firm, who employed some of their old Forth Bridge workmen upon it—men who were well trained to work at great heights. The guide-framing is about 130 feet high; and it was a treat to see with what ease the top beams were raised and bolted into position—the men at the top appearing to be as much at home upon their few inches of foothold as were their colleagues on the ground below.

The Pitlochry Gas Company have just announced a reduction of 1s. 3d. per 1000 cubic feet in the price of gas—bringing it from 9s. 7d. down to 8s. 4d.

The working of the Corporation Electric Lighting Department in Glasgow has up to now resulted in a loss of £1700. There is such

a demand for domestic lighting that the Electric Lighting Committee have resolved to recommend that the dynamos which supply the electricity for street lighting should be removed from the station in Waterloo Street to the premises in John Street, which the Corporation acquired from Messrs. Mavor, Coulson, and Co. when they took over the undertaking of that firm. The space thus set free is to be utilized for the extension of the plant employed in domestic lighting. The cost of the alterations is estimated at £5000.

The annual congress of the British Institute of Public Health is being held in Edinburgh at present. The congress was opened on Thursday, and will close on Monday. Dr. Henry D. Littlejohn, of Edinburgh, is the President. In his opening address, after detailing the history of the sanitary work of the Edinburgh Corporation, he said there were two blots upon their civic life—the constant noise attendant upon their street traffic, and the damage to their lungs and houses by the waste of fuel in the shape of smoke. These constituted the most pressing sanitary problems of the future. Sanitary work was largely discussed in the congress, which led to the consideration of several questions relating to water supply and the disposal of sewage. At the general meeting, held to-day, and which was attended by the Lord Mayors of London and Dublin, Dr. E. Frankland, who was described by the Chairman as "undoubtedly our most distinguished sanitary engineer," was elected an Honorary Fellow of the Institute. Professor Armstrong, of Edinburgh, moved two resolutions, which had been transmitted from the Sanitary Engineering Section, on the subject of the disposal of sewage. At the present time, he said, there was only one system of the disposal of sewage sanctioned by the Local Government Board; whereas it was felt that every case should be treated on its merits, in order that it should be dealt with in the most efficient and economical manner. The first resolution was to the effect that the time had arrived when a Royal Commission should be appointed to take into consideration the different processes of sewage disposal, and to report to Parliament; and the second to the effect that a Committee should be appointed to collect information regarding the making of an inquiry into, and reporting upon, the different schemes of sewage disposal. Both resolutions were adopted.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 29.

Sulphate of Ammonia.—The firmness of the market continues unabated, and that it is not anticipated prices will become easier next month is shown by the eager inquiries for August deliveries, and the willingness of buyers to pay top prices. This constant firmness and steady advance is a great surprise to many, who from month to month expect an easier state of things; but, looking carefully into the position, it is very much to be doubted whether prices can possibly come down for some time. The extreme level reached, and the comparatively low prices of nitrate, leave plenty of scope for arguments, but meanwhile stubborn facts have to be faced. Quotations are generally now at £13 10s. east coast, and £13 7s. 6d. Liverpool. Nitrate is fairly steady at 9s. 9d.

LONDON, *July* 29.

Tar Products.—There is a little more inquiry for pitch; and new business is reported at 23s. 6d. per ton at ports with easy freights, while on the west coast a less price has to be accepted. Benzols are extremely flat; and sales can only be effected at very low prices. A little more life exists in the creosote and oil market; but, at 1d. per gallon (which is the market value), makers will probably be able to burn it in preference to buying coals. Considerable sales of tar acids have been made during the week, but at disappointing figures. Anthracene continues neglected, although the price is nominally maintained. Business has been done during the week at the following rates: Tar, 12s. 6d. to 13s. 6d. per ton. Pitch, 23s. 6d. Benzols, 90's and 50's, 1s. 4d. Solvent naphtha, 1s. 1d. Toluol, 1s. 4d. Crude benzol naphtha, 30 per cent., 6¾d. Creosote, 1d. Creosote salts, 15s. Carbolic acid, 60's, 1s. 6d.; crystals, 6½d. Cresol, 1s. 6d. Anthracene, nominal, 30 per cent., "A," 1s.; "B," 8½d.

Sulphate of Ammonia is very firm at £13 7s. 6d., less 3½ per cent. discount, f.o.b. Considerable competition among dealers goes on for parcels offering. There is a good deal of inquiry for forward delivery; but so far buyers have not come up to sellers' ideas. Gas liquor is quoted at 9s. to 10s.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—During the past week, there has been an excessive pressure for extra supplies of all descriptions of fuel, and a good deal of what would almost seem to be unnecessary excitement in the market. Users of all classes of fuel for furnace, steam, and general manufacturing purposes have shown an anxiety to buy in supplies, to carry them over the next couple of months, almost at any price; and the rush of demand has been such that a great many of the collieries are completely sold out of all the stocks, except in the first and second qualities of house-fire coal. Prices have shown a considerable advance—in a great many cases, quite 2s. to 3s. per ton on house coal, and 3s. to 4s. per ton on engine fuel; and in the Manchester district the leading colliery firms have put up their pit, wharf, and delivered prices 1s. 8d. per ton upon all classes of fuel. Several of the leading colliery firms in the West Lancashire district have gone on supplying the day-to-day requirements of their regular customers at something like old rates, and have declined to entertain any outside business; but now that the pits are stopped, and they are having to fall back upon their stocks to supply the demand, they are necessarily putting on such advances in price as they consider they are entitled to under the circumstances. It is very difficult to give anything like definite quotations, as all sorts of prices are ruling in the market. About 13s. to 15s. per ton is being got for best Wigan Arley; 11s. 6d. to 12s., for Pemberton four-feet and seconds Arley; common round coals are readily fetching 10s. per ton; and through-and-through coal, about 9s. to 9s. 6d. Engine classes of fuel have gone up to an extraordinary extent; and in the open market buyers have been readily giving 8s. 6d. to 9s. per ton for slack at the pit mouth. At most of the collieries, the men continued working up to Friday evening, in accordance with the arrangement that they should go on day-to-day contracts where notices expired before that date; but a good many of the pits were stopped as soon as the formal notices expired. At many of the collieries, a good deal of stock has already been filled up; and at others a considerable portion of it has been practically sold, to be delivered to consumers during the continuance of the strike. There is, however, still a very large quantity of round coal on the pit banks; and although consumers for manufacturing purposes will probably have to go on house-fire qualities at relatively higher prices, it is scarcely likely there will be very much difficulty, where a temporarily increased price for fuel is not a serious consideration, in covering requirements for the next month or six weeks, and generally it is not regarded as probable that the stoppage will extend much beyond the above period. Many of the iron-works will be stopped, rather than pay any materially increased price for fuel; and with regard to gas coal contracts, a few of which are still outstanding, any settlement in these will now be deferred until after the pits have resumed work—and then only subject to fresh quotations being sent in.

Northern Coal Trade.—There has been a little more excitement in the Northern coal trade during the past few days, in consequence of the strike agitation. There is now a very large production—far in excess of that usual at this season of the year; but the demand fully takes it up. Best Northumbrian steam coal is sold largely on old contracts at low prices; but some additional sales have been made at 10s. 6d. per ton f.o.b., and from that up to as high as 11s. per ton is the current quotation. Second-class steam and small steam coals are also correspondingly dearer. The collieries are working full time; and some of them have long turns on. Smithy coal is steady, at about 8s. 6d. per ton; the demand for this class and the price showing very little alteration. In gas coal, there is chiefly a very large delivery on old contracts; the shipments from Durham having been of late enormous. There has also been a good delivery of gas coal to local companies, some of which have fully replenished their stocks. For odd lots, in addition to contracts, higher prices have had to be paid; but such sales have been very irregular in rate. Probably about 6s. 9d. to 7s. 6d. per ton f.o.b. may represent the price that has been paid; but there has been more fluctuation day by day, and the whole range of rates has been irregular. Coke is dearer this week—there being a larger demand from the North-western blast-furnaces; and the price where contracts do not intervene, is also higher. For best Durham coke, shipped in the Tyne or at West Hartlepool, 15s. to 16s. per ton f.o.b. is now the current rate; and it is possible that higher figures may prevail. There is no alteration in the price of gas coke as yet; but the demand is rather tending to increase, as fuel consumers seem inclined to stock.

Scotch Coal Trade.—A waiting game is being played by the miners of Scotland, which tends to dislocate the coal market. They know that a strike in England will create a large demand for Scotch coal—in fact, the demand has set in already; but it cannot be met, on account of the uncertainty which hangs about the doings of the men, and they are prepared to strike in support of an advance in wages whenever the English strike takes place. Conferences are being held, at which the policy is advocated of striking in support of their English brethren; but at one of them the cat was let out of the bag in the statement that "the owners were expecting to make fortunes at the expense of the English miners, and if they in Scotland struck work the owners, he felt sure, would give them the advance very quickly." Meanwhile, the men have resolved to ask an advance of 1s. a day, but to take no extreme measures till the masters consider their demand, which they will do on Wednesday. Prices for coal have risen; the quotations being as follows: Main, 6s. 6d. to 7s.; ell, 7s. to 8s.; splint, 7s. 3d. to 7s. 6d.; and steam, 8s. 3d. per ton f.o.b. Glasgow. Shipments during the week amounted to 118,120 tons—a decrease of 22,961 tons as compared with the preceding week, but an increase as compared with the corresponding week of last year of 11,019 tons. For the year to date, the total shipments have been 3,697,994 tons—a decrease of 380,431 tons as compared with the same period of last year.

Redemption of Bonds of the City of St. Petersburg New Water-Works Company, Limited.—The Secretary of the City of St. Petersburg New Water-Works Company, Limited (Mr. F. Grant), has announced to the holders of "A" debenture bonds that, having received the first half-yearly payment of the annuity from the Municipality of St. Petersburg, in respect of the acquisition of the Company's undertaking, the Directors are prepared to redeem debenture bonds to the extent of £2500, with interest to date of payment.

Sales of Shares.—At the Mart, Tokenhouse Yard, last Wednesday, Messrs. Fox and Bousfield sold by auction freehold a portion of a King's share in the *New River Company* at the average rate of £85,600 per share, *ex div.*; as well as some new £100 shares at £335 each *ex div.* ——At a recent sale, sixty £1 shares in the *Eckington and Mosbro' Gas Company* realized £1 16s. 6d. each; and four £5 shares in the same Company, £7 each.———At Southsea, Messrs. Field and Palmer recently sold, among other local investments, three £50 "B" shares in the *Portsea Island Gas Company* at £106 each, and a parcel of 23 £5 shares (£3 10s. paid) in the *Portsmouth Water Company* at £7 7s. 6d. and £7 10s. per share.——Last Wednesday, £80 of stock of the *Faversham Gas Company* realized £123 10s. at a sale by auction.——Last Thursday, Messrs. Alexander, Daniel, Selfe, and Company sold by auction £20,000 of 7 per cent. maximum ordinary stock in the *Bristol Water-Works Company*, as recently advertised in the JOURNAL. The stock was offered in lots of £100; and the prices realized ranged from £137 to £138 5s., and amounted in the aggregate to £27,410 17s. 6d. ——Last Thursday, at West Hartlepool, Mr. J. W. Crosby offered for public auction 300 £10 per cent. shares in the *Hartlepool Gas and Water Company*, entitled to a dividend from Aug. 28. The prices realized varied from £16 3s. 6d. to £16 10s.—the average being £16 6s.

Electric Light Companies' Dividends.—The annual report of the Edison and Swan United Electric Light Company, Limited, for the year ended the 30th of June, 1893, states that there is a credit balance of £86,642. Of this, £20,633 was distributed on March 14 last, as an interim payment on the "A" shares. The Directors recommend a further payment of £22,976 on those shares, and, the whole of the cumulative preference on them having now been paid, of £3535 on the "B" shares; all to be distributed in accordance with the Articles of Association. This will absorb £47,144; leaving £39,499, which the Directors have carried to the reserve fund. The Directors of the Westminster Electric Supply Corporation, Limited, have declared an interim dividend for the half year ended June 30 last at the rate of 3 per cent. per annum.

Typhoid Fever on the South Coast.—Worthing, the well-known seaside resort contiguous to Brighton, has been suffering from two serious visitations of typhoid fever, which there is reason for supposing were attributable to contaminated water supply. The first outbreak lasted from the 8th of May till the 19th of June, during which period 248 cases were notified to the sanitary authority. Between the latter date and the 2nd of July, the fever abated somewhat, as there were only 20 fresh cases; but it subsequently reappeared with its former virulence, and in the succeeding fortnight no fewer than 515 cases were recorded. Happily the numbers then decreased; and last Wednesday there was not one case. Two samples of the water have been submitted to Professor Crookshank, of King's College, who, after bacteriological examination, has declared the water to be pure, although one sample showed traces of sewage contamination. As one was from the water-works (which are in the hands of the Corporation) and the other from a house in which the fever had appeared, the latter was doubtless the affected one. Dr. Theodore Thomson is to inquire into the cause of the outbreak on behalf of the Local Government Board; and Mr. J. Mansergh has been called in by the Corporation to advise them generally. Already preliminary steps have been taken to secure a fresh source just outside the town; and a well known "diviner" has pointed out certain spots where it is believed an abundant supply of pure water may be obtained. For present needs, arrangements have been made with the West Worthing Water Company to supply the inhabitants.

Unlawfully Taking Water.—At the Dartford Petty Sessions, last Friday, Stephen Diamond was charged on a summons with stealing water from the mains of the Kent Water Company. Mr. A. Dickson, Secretary of the Company, prosecuted; Mr. Chancellor defended. James Lowen, a turncock, said he saw the defendant, when in charge of a traction-engine near Dartford Heath, stop the engine at a fire hydrant, fix a hose from it to the boiler, and turn on the water. In answer to witness, defendant said he had not made any arrangements with the Company for taking the water, but he refused to shut it off. He had a key similar to those used by the New River Company. Mr. Chancellor said the defendant admitted taking the water, but not wrongfully. The engine had broken down, and it was absolutely necessary to get water somehow in order to save the boiler. Mr. Wood (the owner of the engine) had offered to pay for the water, and there was no thought of fraud in the matter. A Magistrate remarked that, if the turncock had not been there, nothing would have been said about paying for the water. Mr. Dickson said no one had a right to take water from a hydrant unless he had an order, or in case of fire. The Company were not actuated by any vindictive feeling in taking the present proceedings; but during the summer the sources from which the engines had obtained their water had fallen short, and attempts were being made to obtain it from the Company's hydrants in the same way that the defendant had done. In the public right, the Company were obliged to see that there was no interference with the hydrants. The Directors did not ask for the full penalty. Defendant was fined £2 and costs.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST

(For Stock Market Intelligence, see ante, p. 209.)

Issue.	Share	When ex-Dividend.	Dividend or Div. Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	13 Apl.	10½	Alliance & Dublin 10 p. c.	10	15½—17½	..	6 0 0
100,000	10	„	7½	Do. 7 p. c	10	11½—12½	..	6 0 0
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	100	102—104	..	4 16 2
100,000	20	31 May	8	Bahia, Limited	20	10½—11½	..	13 18 3
200,000	5	12 May	6¼	Bombay, Limited	5	5½—6	..	5 8 4
40,000	5	„	6½	Do. New	4	3¾—4¼	..	6 2 6
380,000	Stck.	24 Feb.	11½	Brentford Consolidated	100	222—227	..	5 1 4
180,000	„	„	8½	Do. New	100	168—173	..	4 18 3
220,000	20	15 Mar.	11½	Brighton & Hove Original	20	41—43	..	5 6 11
888,500	Stck.	31 Aug.	5	Bristol	100	104—107	..	4 13 5
320,000	20	13 Apl.	11½	British	20	42—44	..	5 4 7
50,000	10	15 Mar.	11½	Bromley, Ordinary 10 p. c.	10	19—20	..	5 15 0
51,510	10	„	8½	Do. 7 p. c.	10	15—16	..	5 6 3
328,750	10	28 July	2	Buenos Ayres (New) Limited	10	5½—6¾*	..	3 11 6
200,000	100	1 July	6	Do. 6 p. c. Deb.	100	97—100	..	6 0 0
150,000	20	13 July	8	Cagliari, Limited	20	25—27	..	5 18 6
550,000	Stck.	28 Apl.	12½	Commercial, Old Stock	100	243—248	..	5 0 10
165,000	„	„	9½	Do. New do.	100	185—190	..	5 0 0
160,762	„	15 June	4½	Do. 4½ p. c. Deb. do.	100	125—130	..	3 9 3
800,000	Stck.	15 June	13	Continental Union, Limited	100	227—232	..	5 12 0
200,000	„	„	10	Do. 7 p. c. Pref	100	190—195	..	5 2 7
75,000	Stck.	15 Mar.	10	Crystal Palace District	100	190—195	..	5 2 7
486,090	10	28 July	10	European, Limited	10	21—22*	..	4 10 11
354,060	10	„	10	Do. Partly paid	10	15—16*	..	4 13 9
5,646,590	Stck.	10 Feb.	12	Gaslight & Coke, A, Ordinary	100	226—231	+1	5 3 10
100,000	„	„	4	Do. B, 4 p. c. max.	100	95—99	..	4 0 10
665,000	„	„	10	Do. C, D, & E, 10 p.c. Pf.	100	263—268	..	3 14 7
30,000	„	„	5	Do. F, 5 p. c. Prf.	100	120—125	..	4 0 0
60,000	„	„	7½	Do. G, 7½ p. c. do.	100	175—180	..	4 3 4
1,300,000	„	„	7	Do. H, 7 p. c. max.	100	170—175	..	4 0 0
463,000	„	„	10	Do. J, 10 p. c. Prf.	100	262—267	..	3 14 10
476,000	„	„	6	Do. K, 6 p. c. Prf.	100	157—162	..	3 14 1
1,061,150	„	15 June	4	Do. 4 p. c. Deb. Stk.	100	125—128	..	3 2 6
294,850	„	„	4½	Do. 4½ p. c. do.	100	128—132	..	3 8 2
908,000	„	„	6	Do. 6 p. c. do	100	170—175	..	3 8 8
3,800,000	Stck.	12 May	12	Imperial Continental	100	220—225	..	5 6 8
75,000	5	15 June	6	Malta & Mediterranean, Ltd.	5	5—5½	..	5 9 1
560,000	100	4 Apl.	5	Met. of Melbourne, 5 p. c. Deb.	100	103—105	..	4 15 3
541,920	20	15 June	5	Monte Video, Limited	20	13—14	..	7 2 10
150,000	5	31 May	10	Oriental, Limited	5	7½—8	..	6 5 0
60,000	5	29 Mar.	7	Ottoman, Limited	5	4½—4¾	..	7 3 8
166,870	10	—	2	Pará Limited	10	2—2½	..	—
420,000	100	2 May	6	People's Gas of Chicago— 1st Mtg. Bds.	100	100—105	..	5 14 3
500,000	100	1 June	6	2nd Do.	100	98—102	..	5 17 8
150,000	10	28 Apl.	5	San Paulo, Limited	10	8½—9½	..	5 5 3
500,000	Stck.	24 Feb.	15½	South Metropolitan, A Stock	100	297—302	..	5 2 8
1,350,000	„	„	12	Do. B do.	100	243—247	..	4 17 2
230,000	„	„	13	Do. C do.	100	253—258	+3	5 0 9
750,000	„	13 July	5	Do. 5 p. c. Deb. Stk.	100	147—151	..	3 6 2
60,000	Stck.	15 Mar.	11½	Tottenham & Edm'nton, "A"	100	215—220	..	5 4 6
				WATER COMPANIES.				
744,897	Stck.	29 June	10	Chelsea, Ordinary	100	259—264	..	3 15 9
1,720,252	Stck.	29 Mar.	8	East London, Ordinary	100	208—213	+3	3 15 1
544,440	„	29 June	4½	Do. 4½ p. c. Deb. Stk.	100	140—145	..	3 2 11
700,000	50	15 June	8½	Grand Junction	50	109—112	+1	3 15 10
708,000	Stck.	10 Feb.	11	Kent	100	280—285	..	3 17 2
1,043,800	100	29 June	9½	Lambeth, 10 p. c. max.	100	237—242	+2	3 18 6
406,200	100	„	7½	Do. 7½ p. c. max.	100	195—200	..	3 15 0
310,000	Stck.	29 Mar.	4	Do. 4 p. c. Deb. Stk.	100	129—132	..	3 0 7
500,000	100	10 Feb.	12½	New River, New Shares	100	329—334	..	3 12 8
1,000,000	Stck.	28 July	4	Do. 4 p. c. Deb. Stk	100	132-135*	+½	2 19 3
902,300	Stck.	15 June	6	S'thwk & V'xhall, 10 p. c. max.	100	149—154	+1	3 18 0
126,500	100	„	6	Do. D 7½ p. c. do.	100	140—145	..	4 2 9
1,155,066	Stck.	15 June	10	West Middlesex	100	253—258	..	3 17 6

*Ex Div

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM LONDON." **GWYNNE & CO.,** TELEPHONE No. 2698.

HYDRAULIC AND GAS ENGINEERS, BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

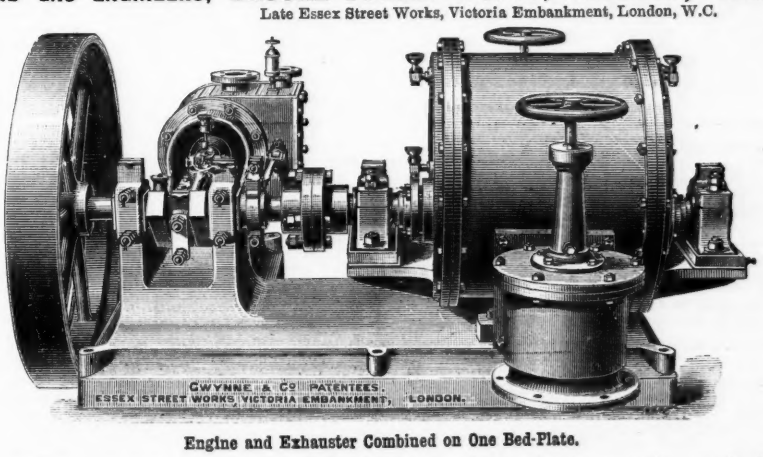
Late Essex Street Works, Victoria Embankment, London, W.C.

Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co., for Gas Exhausters, &c.

They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality.

The result is that in every instance their work is giving the fullest satisfaction.

They have completed Exhausters to the extent of 30,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work, and can be referred to.



Engine and Exhauster Combined on One Bed-Plate.

GWYNNE & Co.'s Exhausters are constructed of large size to pass the required quantity of Gas at very slow speeds; the wear and tear being reduced to a Minimum.

Catalogues and Testimonials sent on Application.

Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

NO OTHER MAKER CAN DO THIS.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; PATENT SELF SEALING AND CLEANSING RETORT-LIDS AND MOUTHPIECES; CENTRIFUGAL PUMPS and PUMPING ENGINES specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

ANDREW STEPHENSON, Agent.
Please address all communications to the Company, as above.

ANDREW STEPHENSON, Agent for BRIN'S OXYGEN COMPANY, Limited, Westminster, S.W.
City Address: 182, Gresham House, Old Broad Street, LONDON, E.C.

VOLCANIC Fire Cement (Winkelmann's)
Fire Resistance 4500° Fahr.
ANDREW STEPHENSON, Sole Agent, 182, Gresham House, Old Broad Street, LONDON, E.C.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH.
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEAR DALKEITH, }

PORTER & CO., Gowts Bridge Works,
LINCOLN, Engineers, Ironfounders, and Contractors, for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER, LINCOLN."

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

YOUNG MAN (Age 21) seeks Situation as IMPROVER. Used to Meter fixing and inspecting, Stove fitting, and usual Gas-Works routine.
Apply, by letter, to No. 2257, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

EXPERIENCED Engineer and Draughtsman desires an APPOINTMENT in a Gas-Works, as Assistant to Manager, or otherwise.
Highest References from leading Gas Engineers.
Address, No. 2260, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BOILER STOKER.

SITUATION wanted as above. Eighteen Months' experience. Moderate wages. Age 24.
Address No. 2264, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser (aged 23), a SITUATION on a Gas-Works, as Assistant to Engineer or Manager. Six years' experience on medium-sized Works. Good Draughtsman. Well up in Practical Gas Testing, Chemistry, and Photometry. Good references.
Address, No. 2261, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Gomersal Gas Company, a MANAGER, SECRETARY, and COLLECTOR combined. Applicants must state age, salary, experience, and references.
Address DANIEL CARTER, Chairman, Gomersal, near LEEDS.

OAKHAM GAS-WORKS,

WANTED, a Young Man as Improver in GAS-FITTING, but would be required to Light and Extinguish half the Public Lamps, and make himself generally useful on the Works.
Apply, with Testimonials, to JAS. MASON, Manager.
July 29, 1893.

WANTED, a steady, reliable Gas-FITTER, well up in Iron and Compo. fitting. Constant employment and good wages for a suitable Man. Total abstainer preferred.
Apply, by letter, enclosing copies of not more than three testimonials or references, stating wages expected to
JOHN SMITH,
Manager.
Gas-Works, Bangor.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.
Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield; AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. II., centre of JOURNAL.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock, Oldham."

PATENTS, DESIGNS, AND TRADE MARKS.

INVENTIONS Protected by Letters Patent. TRADE MARKS REGISTERED at home and abroad. Advice on all questions relating to above. Handbook gratis.
Apply to J. C. CHAPMAN, Chartered Patent Agent, 70, Chancery Lane, LONDON.

HUTCHINSON BROTHERS, Gas Engineers, &c., Falcon Works, Barnsley, Makers of Wet and Dry Gas-Meters, Brass-Work, and general Gas Apparatus, Lead Saturators, Tanks, &c., Tools, and Gas-Works sundries.
Telegrams: "HUTCHINSON BROS., BARNSLEY."

GOLD MEDAL, 1892.

TUBES and Fittings for Gas, Steam, and Water, in stock to 8 inches diameter; Iron and Steel Ascension-Pipes.
JOHN SPENCER, Globe Tube Works, WEDNESBURY; and 14, Great St. Thomas Apostle, LONDON.

CHARTERING, FORWARDING, AND INSURANCE.

ROBERT BRUCE FITZMAURICE, 29, Great St. Helens, London, Shipping Agent to several Gas Companies and Plant Manufacturers, would be glad to UNDERTAKE LARGE or SMALL SHIPMENTS to any Port.

WANTED, several First-Class Retort-SETTERS.
Apply to J. & H. ROBUS, 20, Bucklersbury, LONDON, E.C.

WANTED, for a Works in the South of England (Make about 12 Millions), a SECRETARY and MANAGER. Salary £110 per Annum.
Apply, by letter, giving references, to No. 2266, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A Firm of Wet and Dry Gas-Meter Manufacturers require a REPRESENTATIVE for the North of England. Preference given to a person with experience of the trade.
Applications, in strict confidence, stating salary and terms, to be forwarded to No. 2265, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SPENT Oxide for Sale.
Apply to the SECRETARY, Gas-Works, Swansea, SOUTH WALES.

EXHAUSTER (Rotary), perfectly New (Makers, Dempster and Sons), 20,000 cubic feet per hour, ON SALE, cheap.
Apply to T. G. MARSH, 41, Corporation Street, MANCHESTER.

TO GASHOLDER MAKERS AND OTHERS.

PRESTON DOCKS.

TO be Sold or Let, with immediate possession, either the whole or part of the Premises, containing 58,127 square yards, with the following Buildings thereon—viz., One 379 feet by 112 feet; two each 299 feet by 56 feet; two each 115 ft. 6 in. by 56 ft. 6 in.; and one 224 feet by 126 feet. The Premises, which are well adapted for the erection of large gasholders and gas plant, are situate in close proximity to the New Dock, and have direct railway communication therewith, as also with the London and North-Western and L. & Y. Railways, by means of a railway running into the works.
Further Particulars may be had from Mr. HENRY GREEN, Gas Offices, Fishergate, PRESTON; or from Mr. T. WHITEHEAD, Solicitor, 54, Fishergate, PRESTON.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE & CO., direct Importers from Ireland. Sample and Price on application.
OXIDE PAINT, SULPHURIC ACID, & Chemicals.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

OXIDE OF IRON.

FINEST Quality of Natural Bog Ore.
Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

MESSRS. DEBENHAM, TEWSON, FARMER, and BRIDGEWATER'S MONTHLY LIST of Shops, Show-Rooms, Factories, and Waterside Premises, suitable for the Exhibition and Manufacture of Engineering and other Appliances, may be obtained, free of charge, at their Offices, 80, CHEAPSIDE, E.C.

LIQUOR, Tar, and Spent Oxide wanted.
BROTHERTON AND CO., Ammonia and Tar Distillers, BIRMINGHAM, LEEDS, and WAKEFIELD.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 315, St. Vincent Street, GLASGOW; and 85, Water Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

WANTED, Gas Liquor.
Address GEORGE DOBSON, LIMITED, CARDIFF.

GAS CANNEL.

FOR SALE—1000 tons of North Wales SMOOTH CANNEL, immediate delivery. Gas per ton, 11,300 cubic feet. Illuminating Power, 23 candles.
Apply to MONTAGU HIGGINSON AND CO., 6, York Buildings, LIVERPOOL.

FOR SALE—A second-hand, combined CONDENSING AND PURIFYING APPARATUS, with two boxes 3 ft. by 2 ft. 6 in. each; 4-inch Centre-Valve; Lifting Gear, &c., complete. Suitable for experimental or small Gas-Works.
For further particulars apply to EDW. LONG, Secretary Sutton Valence Gas Company.

FOR SALE, the following second-hand GAS PLANT:—
GASHOLDER, 35 ft. by 14 ft.
GASHOLDER and Cast-Iron TANK, 30 ft. by 17 ft.
Four PURIFIERS, 12 ft. square by 4 ft. 6 in. deep.
Cast-Iron SCRUBBER, 36 ft. high by 10 ft. diameter.
CONDENSERS to pass 500,000 cubic feet per diem.
EXHAUSTER to pass 20,000 cubic feet per hour.
Also various other sizes of above or any Gas Plant. Inquiries invited.
Apply to SAML. WHILE, 60, QUEEN VICTORIA ST., E.C.

SPECIAL BARGAIN.

FOR SALE—Two perfectly new Cast-Iron SCRUBBERS, 10 feet diameter by 50 feet high, with Wrought-Iron Domes, Cast-Iron Spiral Staircase, &c., complete. All plates machine planed. One or both Scrubbers will be sold to suit purchasers.
A perfectly new 30,000 per hour HORIZONTAL DOUBLE PUMP RECIPROCATING EXHAUSTER, with Steam-Engine, with Connections and Valves.
One Second-hand (thoroughly overhauled) VERTICAL PUMP EXHAUSTER, with Steam-Engine (with clean Water and Liquor Pumps attached), to pass 7000 cubic feet of Gas per hour.
One Second-hand (thoroughly overhauled) ROTARY EXHAUSTER, to pass 7000 cubic feet per hour (without Engine), fitted with Pulleys.
The whole of the above Plant can be inspected, and full particulars with prices will be sent, on application to No. 2241, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CORPORATION OF NELSON.

THE Gas Committee of the above Corporation invite TENDERS for the supply of a GAS EXHAUSTER to pass 60,000 cubic feet per hour.

Further Particulars and Form of Tender can be obtained from the Gas Engineer, Mr. W. Foster.

Tenders to be sent to the undersigned not later than the 9th day of August next.

R. M. PRESCOTT,
Town Clerk.

Town Hall, Nelson,
July 18, 1893.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One Year, from the 14th day of October next.

Delivery on Company's Works, filled into Purchaser's Tanks or in Barges alongside Works.

Payment, cash monthly.

Sealed tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Thursday, the 31st of August next; but the Directors do not bind themselves to accept the highest or any tender.

By order,
W. A. PADFIELD,
Secretary.

COUNTY BOROUGH OF WIGAN.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Wigan Corporation invite TENDERS for the surplus TAR produced at their Gas-Works, over a period of One, Two, or Three Years, commencing on the 1st of September, 1893.

Particulars and Form of Tender may be obtained on application to the undersigned.

The highest tender not necessarily accepted.

Tenders, sealed and endorsed "Tar," to be delivered to A. Smith, Esq., Town Clerk, on or before Aug. 14, next ensuing.

JOS. TIMMINS,
Engineer.

Borough Gas-Works, Wigan,
July 26, 1893.

WREXHAM GASLIGHT COMPANY.

TO TAR DISTILLERS, ETC.

THE Directors of the above Company invite TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their Works for One, Two, or Three Years, commencing on the 1st day of August next.

Quantity produced, about 450 and 550 tons respectively.

Further Information may be obtained on application to the undersigned, to whom tenders must be sent not later than the 2nd day of August next.

The Directors do not bind themselves to accept the highest or any tender.

By order of the Board,
THOS. WALKER,
Secretary and Manager.

Wrexham, July 7, 1893.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

TO IRONFOUNDERS, ETC.

THE Gas Committee are prepared to receive TENDERS for a supply of about 400 yards of 10-inch CAST-IRON MAINS (weight per yard not to exceed 200 lbs.), about 1000 yards of 4-inch (weight not to exceed 46 lbs.), about 1500 yards of 3-inch (weight not to exceed 34 lbs.), and for IRREGULARS, delivered free on Rails at Stockport Station.

Tenders, endorsed "Mains," and addressed to the Chairman of the Gas Committee, Stockport, to be sent in on or before Four p.m., on Friday, Aug. 4, next ensuing.

The resolution of the Council that Contractors will be expected to pay the average rate of wages paid in the district will apply to this contract.

Forms of Tender and any further Information may be obtained on application to the Engineer, Mr. S. Meunier.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
WALTER HYDE,
Town Clerk.

July 25, 1893.

MANCHESTER CORPORATION GAS-WORKS.

AMMONIACAL LIQUOR.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the PURCHASE and REMOVAL of the AMMONIACAL LIQUOR to be produced at the Gaythorn, Rochdale Road, and Bradford Road Gas-Works during a period of one or more years, commencing at Noon on the 30th day of June, 1894.

The Committee do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Ammoniacal Liquor," must be delivered at the Offices of the Gas Department, Town Hall, on or before Monday, the 4th of September, 1893.

Forms of tender and further particulars may be obtained on application—in writing only—to Mr. Charles Nickson, Superintendent of the Department.

A deposit of one guinea (which will be returned on receipt of the tender) must accompany each application for a tender form.

By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.

Town Hall, Manchester,
July 21, 1893.

NORTH OF IRELAND

ASSOCIATION of GAS MANAGERS.

THE

ANNUAL MEETING

Of this Association

WILL BE HELD IN THE

HALL OF THE CAFÉ, COLERAINE,

ON TUESDAY, AUG. 8, 1893.

The Chair to be taken at 11.30 a.m. by the President, Mr. W. S. STORMONTH.

The business will consist of the Inaugural Address; Papers by Messrs. Outon and Main, on the "New Oil-Gas Works at Inchicore, Dublin," and on the "History and Development of Gas Cooking;" and a Lecture on "Processes for Manufacturing Gas from Oil, with special reference to the Peebles Process," by W. Ivison Macadam, F.R.S.E., F.I.C., F.C.S., of Edinburgh.

The Members will dine together in the Cloth Workers' Arms Hotel, at Four p.m. Tickets, 4s. each, to be had from the Secretary. *It is important that* Dinner Tickets should be secured *not later than the 4th of August.*

On Wednesday, it has been arranged for the Members and their Lady Friends to have an Excursion to the Giant's Causeway. Brakes will leave the Cloth Workers' Arms Hotel at 10 a.m.; Luncheon at Causeway at 2 p.m.; Tea at 5 p.m.; Return at 6 p.m. Arrangements will be made for those wishing to return earlier to catch Trains for Belfast and Derry. Tickets for Excursion, to include Drive, Lunch, and Tea, 7s. 6d. each person; and they must be secured not later than Aug. 4.

JAMES WHIMSTER,
Hon. Secretary.

Gas-Works, Armagh, July 26, 1893.

BOROUGH OF ROCHDALE.

TO CHEMICAL MANUFACTURERS.

THE Gas Committee of the Corporation invite TENDERS for the supply of such quantities of BROWN OIL OF VITRIOL as they may require during the ensuing Twelve Months. The Acid to be made from Pyrites or recovered Sulphur, and to be delivered at the Rochdale Railway Station.

Further Information can be obtained from Mr. T. B. Ball, Manager, Gas-Works, Rochdale.

Tenders, endorsed "Vitriol," must be sent to me not later than noon of Wednesday, the 9th of August next.

By order,
ZACH. MELLOR,
Town Clerk.

Town Hall, Rochdale,
July 29, 1893.

STOCKTON-ON-TEES CORPORATION.

TENDERS FOR GAS COAL.

THE Gas Committee of the above Corporation invite TENDERS for the supply in whole or in part of 30,000 tons of GAS COAL for the year ending Aug. 31, 1894.

Particulars and Form of Tender can be obtained on application to the undersigned at the Gas-Works.

Tenders, sealed and endorsed "Tender for Gas Coal," to be sent in not later than noon of the 24th day of August, 1893, addressed to M. B. Dodds, Esq., Town Clerk, Stockton-on-Tees.

The Gas Committee do not bind themselves to accept the lowest or any tender.

WILLIAM FORD,
Manager.

Gas-Works, Stockton-on-Tees,
July 27, 1893.

LEIGH LOCAL BOARD.

THE Gas Committee of the Leigh Local Board invite Tenders for the purchase of the surplus TAR produced at their Gas-Works for a period of One Year from the 1st of September next.

All Particulars, with Form of Tender, may be had from the undersigned.

Sealed tenders, endorsed "Tar," and addressed to J. Thorp, Esq., Chairman, to be delivered at the Town Hall, Leigh, on or before Monday, the 14th of August next.

The highest or any tender not necessarily accepted.

ALFRED T. FLETCHER,
Engineer and Manager.

Gas-Works, Leigh, Lancs.,
July 29, 1893.

TENDERS FOR GAS COAL.

THE Directors of the Newark Gas Company are prepared to receive TENDERS for the supply of 6000 tons of best screened SOUTH YORKSHIRE GAS COAL, delivered at Newark, G.N.R., in such quantities as may be required during the ensuing Year from Sept. 1 next.

The Coal to be delivered fresh wrought, free from Dirt, Bats, Shale, Pyrites, and other Impurities.

Tenders, marked on the outside "Tender for Coal," to be sent in to me on or before Aug. 8, 1893.

Terms: Cash Monthly.

For further Particulars apply to

FREDK. B. FOOTITT,
Secretary.

Newark, July 24, 1893.

WILLIAM LIVESEY TESTIMONIAL FUND.

COMMITTEE.

HOWARD CHARLES WARD, *Chairman.*

FRANK BUSH.	C. R. MEAD.
I. A. CROOKENDEN.	FRANK MORRIS.
H. E. JONES.	THOMAS NEWBIGGING.
WALTER KING.	MAGNUS OHREN.
WILLIAM KING.	J. ORWELL PHILLIPS.
F. L. LINGING.	G. C. TREWBY.

CORBET WOODALL, *Hon. Secretary.*

LIST OF SUBSCRIPTIONS.

	£	s.	d.
Adair, Sir Hugh	5	5	0
Aird, John, M.P.	5	5	0
Alliance and Dublin Consumers' Gas Company	5	5	0
Ayris, John	5	5	0
Bath Gaslight and Coke Company	5	5	0
Blott, E. B.	1	1	0
Bournemouth Gas and Water Company	10	10	0
Bowker and King	5	5	0
Bristol Gas Company	5	5	0
British Gaslight Company, Limited	10	10	0
Broadberry, W. H. H.	1	1	0
Burke, Ulick J.	5	5	0
Bush, Frank	5	5	0
Bush, F. J.	5	5	0
Canterbury Gas and Water Company	3	3	0
Cheltenham Gaslight and Coke Company	5	5	0
Church, Jabez	5	5	0
Clarke and Co., Stephenson	2	2	0
Clayton, Allerton, and Thornton Gas Company	3	3	0
Cloudsley, John L.	5	0	0
Cocker, John L.	5	5	0
Colchester Gas Company	5	5	0
Colney Hatch Gas Company	4	4	0
Crookenden, I. A.	5	5	0
Croxford, W.	5	5	0
Crystal Palace District Gas Company	10	10	0
Derby Gaslight and Coke Company	5	5	0
Dougall, Andrew	5	5	0
Exeter Gaslight Company	10	10	0
Falmouth Gas Company	5	5	0
Garnett, George	1	11	6
Gibbons, B., Junr.	5	5	0
Green, Henry	3	3	0
Grimthorpe, Right Hon. Lord	5	0	0
Harrow District Gas Company	5	5	0
Hartlepool Gas and Water Company	3	3	0
Head, W. G.	5	5	0
Hepworth, J.	3	2	0
Horsley, C.	5	5	0
Hunt, Charles	3	3	0
Jones, H. E.	5	5	0
Jones, H. H.	5	5	0
Jones, Robert	5	5	0
Jones, R. H.	5	5	0
Kidsgrove Gaslight Company	2	2	0
King, Walter	5	5	0
King, William	5	5	0
Kingston-on-Thames Gas and Coke Company	5	5	0
Leamington Priors Gas Company	5	5	0
Linging, F. L.	5	5	0
Livesey, Frank	5	5	0
Lowe, James	1	1	0
Macnie, John	2	2	0
Makins, Colonel W. T.	5	5	0
Malton Gas Company	3	3	0
M'Gilchrist, James	1	1	0
Mead, C. R.	5	5	0
Morris, Frank	5	5	0
Newbigging, Thomas	5	5	0
Newcastle-upon-Tyne and Gateshead Gas Company	10	10	0
Newport (Isle of Wight) Gas Company	1	1	0
Noel, Hon. H. L.	5	5	0
Northampton Gaslight Company	5	5	0
Northfleet & Greenhithe Gas Company, Limited	3	3	0
Ohren, Magnus	1	11	6
Paddon, J. B.	5	5	0
Phillips, J. Orwell	5	5	0
Plymouth and Stonehouse Gaslight and Coke Company	10	10	0
Preston Gas Company	10	10	0
Randall, James	1	1	0
Reading Gas Company	10	10	0
Richmond Gas Company	10	10	0
Rochester, Chatham, and Strood Gas Company	5	5	0
Southampton Gaslight and Coke Company	5	5	0
South Metropolitan Gas Company, Directors of the	36	15	0
South Shields Gas Company	5	5	0
Sunderland Gas Company	10	10	0
Syms, W.	1	1	0
Tottenham and Edmonton Gas Company	10	10	0
Trewby, G. C.	5	5	0
Tunbridge Wells Gas Company	3	3	0
Valon, W. A.	3	3	0
Walmisley, E.	5	5	0
Waltham Abbey and Cheshunt Gas Company	5	5	0
Wandsworth and Putney Gaslight and Coke Company	5	5	0
Ward, Howard Charles	5	5	0
Wellingborough Gaslight Company, Limited	5	5	0
West Ham Gas Company	10	10	0
Weston-super-Mare Gaslight Company	4	4	0
Weymouth Consumers' Gas Company	5	5	0
Williams and Co., Alfred	5	5	0
Woodall, Corbet	5	5	0
Woodall, Henry	5	5	0
Woodall, William, M.P.	3	3	0
Wyatt, Sir Richard H.	5	5	0
Young, John	1	1	0

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is hereby given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Guildhall Tavern, Gresham Street, in the City of London, on Friday, the 25th day of August, 1893, at Half-past Twelve o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last, to declare a Dividend, and to transact the General Business of the Company.

The Transfer Books will be closed from the 12th to the 25th of August, both inclusive.

By order of the Board,
ALFRED LASS, Secretary.

Offices: 30, Gracechurch Street, London,
July 28, 1893.

HEYWOOD CORPORATION GAS-WORKS.

TENDERS are invited for Steam Tubes and FITTINGS.

Particulars from Mr. W. Whatmough, Gas Manager. Tenders, endorsed "Tubes and Fittings," to be sent to the undersigned not later than Tuesday, Aug. 15, 1893.

By order,
A. B. PILLING,
Town Clerk.

Municipal Buildings, Heywood,
July 27, 1893.

HORNSEY GAS COMPANY.

NOTICE is hereby given, that the ORDINARY GENERAL MEETING of the Shareholders in the above Company will be held at the Offices, No. 63, Chancery Lane, in the county of Middlesex, on Friday, the 18th day of August, 1893, at Three o'clock in the Afternoon precisely, to receive a Report from the Directors, declare Dividends, elect an Auditor, and transact the usual business of a General Meeting.

The Transfer Books will be closed on the 4th of August next until after the General Meeting.

By order of the Board,
S. J. WILLIAMS,
Secretary.

Offices: 63, Chancery Lane, London, W.C.,
July 28, 1893.

In Paper Cover, Price 1s.

GASHOLDERS
WITH OR WITHOUT
GUIDE-FRAMING.

A DISCUSSION
BETWEEN
E. LLOYD PEASE & F. SOUTHWELL CRIPPS.

To which is added a Synopsis of all the Literature (English and Foreign) on Reducing or Abolishing the Guide-Framing of Gasholders, also the principal Literature on Gasholder Construction generally, compiled to March, 1893; with a List of all the English and Foreign Periodicals connected with the Gas Industry.

By F. SOUTHWELL CRIPPS.

LONDON:
WALTER KING, Office of the "Journal of Gas Lighting," &c.,
11, BOLT COURT, FLEET STREET, E.C.

NOW READY.

GAS AND WATER CO.'S DIRECTORY, 1893.
Seventeenth Annual Issue, 5s.
GAS-WORKS STATISTICS, 1893.
Fifteenth Annual Issue, 3s. 6d.
WATER-WORKS STATISTICS, 1893.
Thirteenth Annual Issue, 2s. 6d.
Handsomely Bound in One Vol., Price 10s.

LONDON: HAZELL, WATSON, & VINEY, Ltd.,
1, CREED LANE, E.C.

CASES FOR BINDING
VOLUMES OF THE "JOURNAL"

(GREEN CLOTH, GILT LETTERED)

Price 2s. each.

For **FIRE-BRICKS**, the most durable for **GAS-FURNACES**,

ADDRESS

JAMES WHITE & Co., Limited,
ALBERT WORKS, WIDNES.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas Water, Railway, Telegraph Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

MEIKLEJOHN'S PATENT

Improved Slide-Valve Anti-Dip.

Is perfectly reliable in action, and requires no attention. Has all the advantages of the Dip and Anti-Dip combined.

Is cheap and easily fixed to any form of main.

Will be found the most efficient appliance of the kind yet introduced.

Further particulars and price from

C. MEIKLEJOHN,
GAS-WORKS, RUGBY.

(Late N. MEIKLEJOHN, Longwood.)

ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

43, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

LONDONDERRY GAS COALS
FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.

Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

OIL GAS ENRICHMENT COMPANY, LIMITED.
YOUNG & BELL'S PATENTS.

(PEEBLES PROCESS.)

CAPITAL: £30,000, in 20,000 Preference Shares and 10,000 Ordinary Shares of £1 each.

DIRECTORS.

WALTER THORBURN, ESQ., M.P.
HUGH BROWN, ESQ., Director Caledonian Railway Company.
GEORGE HARRISON, ESQ., Merchant, Edinburgh.
GEORGE BEILBY, ESQ., St. Kitts, Slateford.
JAMES MILNE, ESQ., Milton House, Edinburgh.
WILLIAM YOUNG, ESQ., Priorsford, Peebles.

SOLICITORS.

MESSRS. SMITH & MASON, S.S.C., 28, Queen Street, Edinburgh.

BANKERS.

THE UNION BANK OF SCOTLAND, EDINBURGH.

This Company has been registered for the purchase and working of the above Patents.

Applications for Prospectus should be made to the Solicitors at once, as the list closes on an early day.

EDINBURGH, *July* 27, 1893.

HUNTER'S

OXIDE OF IRON.

JAMES HUNTER, LESSEE, MINER, AND SHIPPER OF NATURAL IRISH BOG ORE.

This Estate yields the finest and most uniform quality in Ireland; and the quality is guaranteed.

Samples and Prices on application.

11, BAY STREET, PORT GLASGOW.

Telegrams: "HUNTER PORT GLASGOW."

Established 1872.

FAMOUS LEESWOOD

"CURLEY CANNEL."

YIELD: 15,306 CUB. FT. PER TON OF 30·62-CANDLE POWER.

SMOOTH CANNEL.

YIELD: 12,321 CUB. FT. PER TON OF 21·321-CANDLE POWER.

PRICES AND PARTICULARS OF

MESSRS. S. CHANDLER & SONS,

LEESWOOD COAL AND CANNEL MINES,

PONTYBODKIN, nr. MOLD, NORTH WALES.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY

LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE

BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE;

OR

E. FOSTER & CO.,

21, JOHN STREET, ADELPHI, LONDON, W.C.

HOLMSIDE GAS COALS.

(Wrought out of Holmside and South Moor Collieries.)

PRESENT production 4000 tons per working day. Area of coal about 5000 acres, including the largest remaining workable proportion of pure HUTTON SEAM GAS COAL. Analysis of HOLMSIDE GAS COAL *in bulk as shipped* gives 10,500 cubic feet of Gas per ton, of an Illuminating Power of 16¼ candles. The Sulphur is about 1 per cent., and the Ash 1¾ per cent. The Coal cokes well, and leaves about 70 per cent. of excellent Coke. To show the progress of HOLMSIDE COALS, it may be mentioned that the quantity carbonized by the London Gas Companies in 1885 was about 200,000 tons; whereas the present consumption of HOLMSIDE COALS in London alone is at the rate of nearly

600,000 Tons per Annum.

Full particulars on application to

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES,

NEWCASTLE-ON-TYNE.

AUG. KLÖNNE,

DORTMUND (GERMANY).

REGENERATIVE FURNACES.

Unsurpassed in Efficiency, Economy, Durability, and Easy Working.

TAR AND LIQUOR PURCHASED.

JOHN CLARKSON MAJOR,

(Established 1851,)

Tar Distiller and Manufacturing Chemist,

WOLVERHAMPTON.

SCULCOATS, HULL.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.

RAVENSTHORPE, NEAR DEWSBURY.

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES,

SPANNERS, RATCHET BRACES, LIFTING JACKS,

ANVILS, VICES,

AND ENGINEERS' TOOLS GENERALLY.

London Office:

90, CANNON STREET, E.C.

COKE BREAKERS,

PRICES REDUCED.

(THOMAS & SOMERVILLE'S PATENT.)

New Design, with two Cutting Rollers, making less Breeze than their old pattern.

For Exhauster Advertisement, see last week.

GEORGE WALLER & CO.,

PARK STREET, SOUTHWARK, E.C.,

And at STROUD, GLOUCESTERSHIRE.

CAST-IRON PIPES

FOR GAS AND WATER.

Pipes, One to Six inch Bore, kept in Stock. Also a very large assortment of all sizes of Bends, T-pieces, and Specials ready for despatch on receipt of Order.

VALVES

FOR GAS, WATER, AND STEAM.

TELEGRAMS "PIPES GLASGOW."

WM. MACLEOD & CO.,

56, ROBERTSON STREET, GLASGOW.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON AND COAL COMPANY, Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

The Analysis made by Messrs. J. and H. T. Pattinson, Public Analysts for Northumberland, gives 10,500 cubic feet of Gas per ton, with an Illuminating Power of 16·3 Candles and 67·3 per cent. of Coke. The following is a Working Analysis made of these Coals by the Tudhoe and Sunderland Bridge Gas Company:—

[COPY.]

TUDHOE AND SUNDERLAND BRIDGE GAS COMPANY.

Tudhoe Gas-Works,
Spennymoor,
8th June, 1893.

Messrs. The

WEARDALE IRON & COAL COMPANY, LTD.

GENTLEMEN,

For the last two months we have used your **THORNLEY GAS COAL** exclusively at these gas-works; and I have pleasure in herewith giving you the actual results obtained during the trial.

Yield of Gas per ton: 10,300 cubic feet.

Yield of Coke: 13½ cwt.

Illuminating Power of Gas, average of a series of tests, **17 Sperm Candles.**

The Coke was of excellent quality.

The following is a complete ultimate Analysis of the Coal.

	Per Cent.
Carbon	83·128
Hydrogen	5·116
Oxygen	7·401
Nitrogen	0·585
Sulphur	0·620
Ash	3·130
Water	0·020
	100·000

Analysis of the Coke.

Carbon	93·31
Sulphur	0·61
Ash	5·00
Moisture	1·08
	100·00

I am, Gentlemen,
Yours truly,
A. B. COWAN,
Manager.

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld.

QUAYSIDE, NEWCASTLE-ON-TYNE.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.,
Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton . .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Ipswich Gaslight Company, Devonport Gas Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the

HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.
W. H. PARKINSON,
FITTER.

NIDDRIE CANNEL

A FIRST-CLASS CANNEL COAL,

Yielding a large volume of rich Gas, and fully 60 per cent. of first-class Coke.

FOR ANALYSIS, PRICE, AND ALL OTHER PARTICULARS, APPLY TO

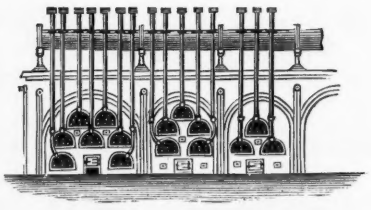
The Niddrie & Benhar Coal Co., Ltd.,
15, HANOVER STREET,
EDINBURGH.
Telegrams: "BENHAR, Edinburgh."

T. B. KITTEL, SHEFFIELD.
CONTRACTS FOR SUPPLIES OF ANY OF THE PRINCIPAL
ENGLISH & SCOTCH CANNELS.
REAL SILKSTONE GAS COAL
ANALYSIS AND PRICES ON APPLICATION.
T. B. KITTEL, SHEFFIELD.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

DEMPSTERS'



RETORT-SETTINGS,
RETORT-FITTINGS,
ELLAND.

ALEX. C. HUMPHREYS, M.E.,
General Superintendent & Chief Engineer,
The United Gas Improvement Company, U.S.A.

A. G. GLASGOW, M.E.,
Late General Inspector,
The United Gas Improvement Company, U.S.A.

HUMPHREYS & GLASGOW,

Contracting Engineers for Water Gas Plant,
9, Victoria Street, London, S.W.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of
ALDWARKE MAIN CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.
ALDWARKE MAIN GAS COAL

Analysis: 12,600 feet of 19-candle gas per ton.
Weight of illuminating power in pounds of sperm, 320·80. Very free from impurities.
Telegrams: "ATLAS SHEFFIELD."

ALDER AND MACKAY,

MANUFACTURERS OF

IMPROVED WET AND DRY GAS-METERS

IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.

ORIGINAL MANUFACTURERS OF DRY METERS IN CAST-IRON CASES.

STATION METERS, EXPERIMENTAL METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

Results of Tests of Dry Gas-Meters (Section III.) of the Glasgow Philosophical Society's Gas Exhibition, as per London "Gas Journal," May 10, 1881.

	ALDER & MACKAY.	W. & B. COWAN.	G. GLOVER & Co.	JAMES KEITH.	D. B. PEEBLES & Co.
Total of Fast Tests . .	47·2 ...	6·9 ...	33·6 ...	62·3 ...	53·7
Total of Slow Tests . .	25·3 ...	117·4 ...	43·1 ...	31·4 ...	38·5
	72·5 ...	124·3 ...	76·7 ...	93·7 ...	92·2

Descriptive Circulars, Price Lists, and Full Particulars forwarded on application.

NEW GRANGE WORKS, EDINBURGH.

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND DISTRICT OFFICE: 22, TEMPLE ST., BIRMINGHAM—SOLE AGENT: A. C. SCRIVENER.

TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.

LONDON DISTRICT OFFICE: 6, STRAND, LONDON—C. PARKER & SON, SOLE AGENTS.

TELEGRAPHIC ADDRESS: "PARKER LONDON."

WILLEY & Co.,

Gas Engineering Works, Commercial Road, Exeter,

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS.

GASHOLDERS, Telescope and Single Lift, any size. Some of the largest in the Kingdom, erected by this Firm, are giving the highest satisfaction.

PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works,** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **MR. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy** of **Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

Price Lists, Specifications, and Estimates provided for any work appertaining to Gas Lighting, from the Retort-House to the Drawing-Room.

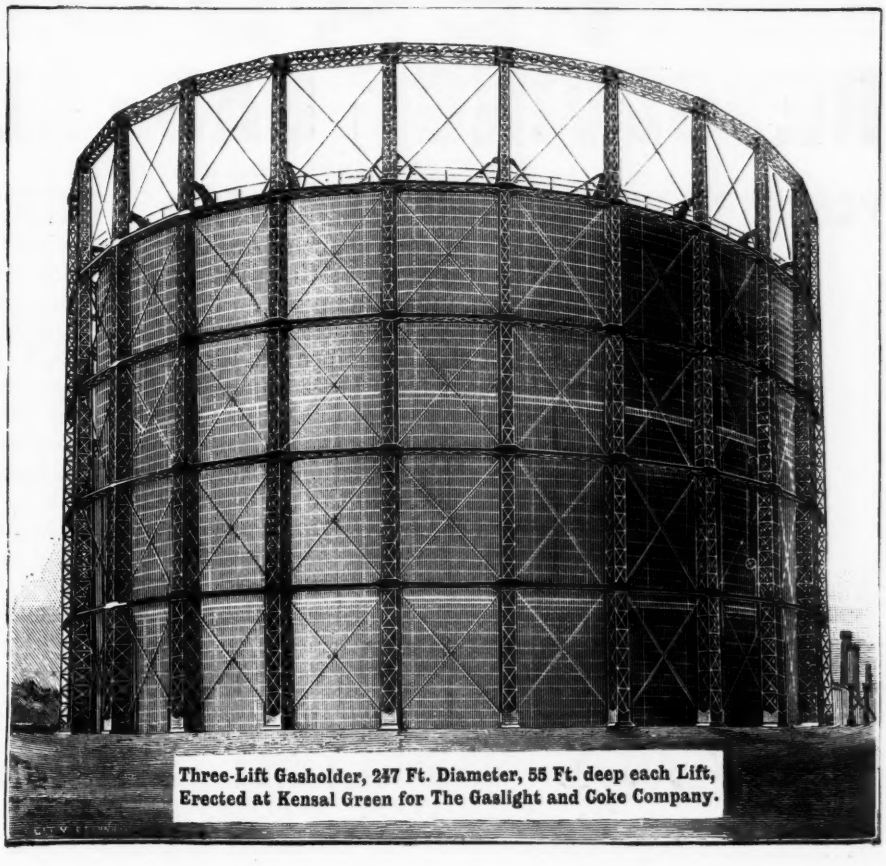
SAML. CUTLER & SONS, MILLWALL, LONDON.

NEARLY

8 MILLION

CUBIC FEET

CAPACITY.



Three-Lift Gasholder, 247 Ft. Diameter, 55 Ft. deep each Lift, Erected at Kensal Green for The Gaslight and Coke Company.

Price One Guinea.

PRECEDENTS IN PRIVATE BILL LEGISLATION AFFECTING GAS & WATER UNDERTAKINGS.

1879-1890.

By E. H. STEVENSON and E. K. BURSTAL, MM.Inst.C.E.

The Work published in 1879 by the late Mr. Stevenson is still on sale.

LONDON: WALTER KING, 11, BOLT COURT, FLEET ST., E.C.

HYDRATED OXIDE OF IRON

FOR GAS PURIFICATION.

Two to three times as rich in Hydrate as Bog Ore.

STRONG ACTION ON SULPHURETTED HYDROGEN.

We have for sale Hydrate of Iron containing 77 per cent. of Ferric Oxide and 17 per cent. of Water. Directions given for mixing for Purifiers.

LESS THAN HALF THE PRICE OF BOG ORE.

ADDRESS—

READ HOLLIDAY & SONS, LTD., HUDDERSFIELD.

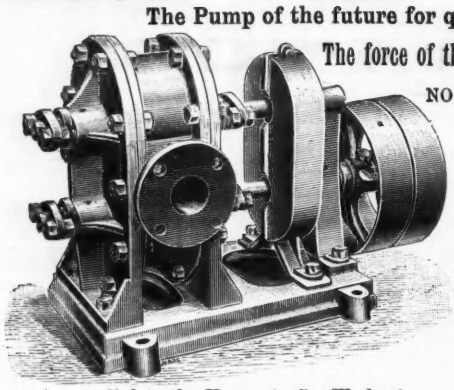
JOHNSON'S PATENT

DRUM PUMP AND GAS EXHAUSTER.

The Pump of the future for quickly and economically moving large bodies of Water.

The force of the Piston Pump with the capacity of the Centrifugal combined.

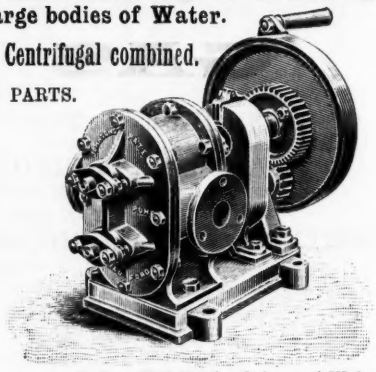
NO SLIDES OR FRICTIONAL WORKING PARTS.



As supplied to the Harrogate Gas-Works for Pumping Gas Liquor.

NO PRIMING.

NO VALVES.



As supplied to H.R.H. the Prince of Wales for Pumping Gas Liquor at his Sandringham Gas-Works.

DRUM ENGINEERING COMPANY,

Hydraulic and Pneumatic Engineers, **55, ATHOL ROAD, BRADFORD.**

"YEADON"

REVOLVING GAS-RETORTS

(YEADON AND ADGIE'S PATENTS)

POSSESS THE FOLLOWING ADVANTAGES OVER ALL OTHERS:—

1. **Occupy only one-fourth the space of ordinary Carbonizing Plant.**
2. **Continuous Automatic process; Gas produced in 12½ minutes.**
3. **Produce 25 per cent. more Gas per Ton of Coal carbonized.**
4. **Richer Gas of 15 per cent. additional Illuminating Power.**
5. **Utilize the smallest size, therefore the lowest price, Coal.**
6. **Proportionate increase from large Coal when broken as for Stoking-Machines.**
7. **Enrichment of Gas by Cannel Coal, Oils, &c., rendered unnecessary.**
8. **No deposit of Carbon in Retorts, or choked Ascension-Pipes.**
9. **Fogs conquered by the production of Gaslight on five hours' notice.**
10. **25 per cent. of Lime saved in the process of Purification.**
11. **Retorts can be used for Revivifying Spent Lime in 20 minutes.**
12. **Revivify Spent Oxide for the recovery of Sulphur Compounds.**
13. **Sunday Ordinary Labour and Nightwork reduced 75 per cent.**
14. **Overwork and Overtime abolished; also Casual and Foreign Labour.**

For Articles on and descriptive of the above Apparatus, see *Journal of Gas Lighting* for Dec. 13, 1892; March 7, April 25, May 2, and May 16, 1893. Also, the *Gas World*, Jan. 21 and May 6, 1893.

FULL PARTICULARS AND ESTIMATES GIVEN BY

THE YEADON GAS-RETORT SYNDICATE, LIMITED,

4, ALBION PLACE, LEEDS;

Or their Sole Representatives: **D. M. NELSON & SONS, 68, Bath Street, GLASGOW.**

R. & J. DEMPSTER,

GAS PLANT WORKS,

NEWTON HEATH, MANCHESTER.

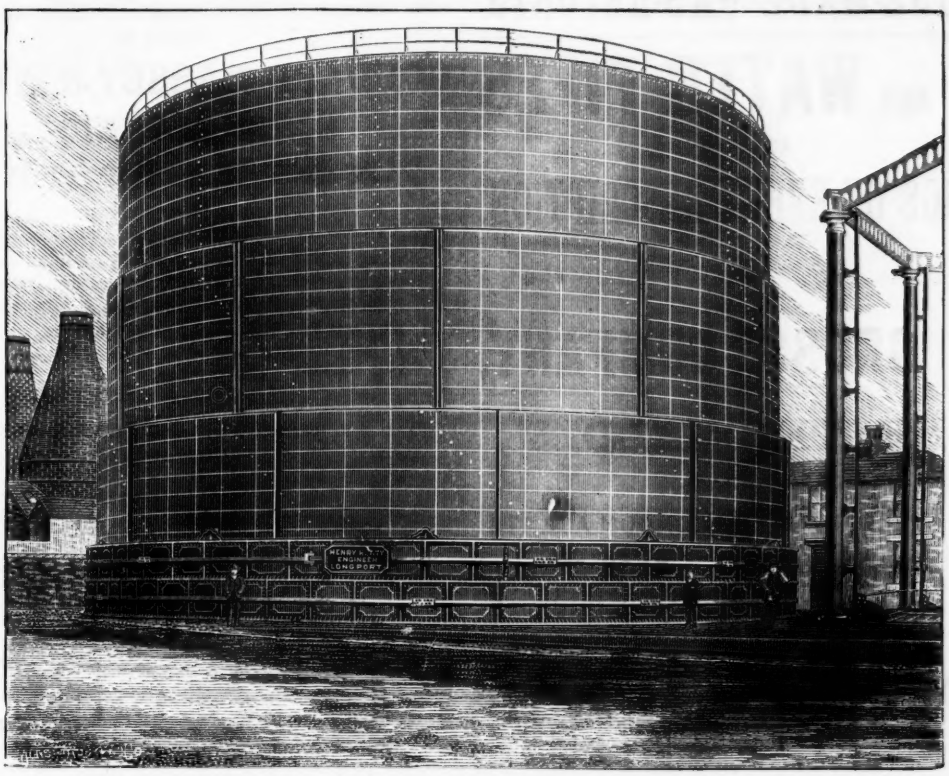
Makers of every kind of Gas Apparatus and Structural Ironwork.

Sole Licensees of

SPIRAL-GUIDED GASHOLDERS,

WHEREBY COSTLY GUIDE-FRAMING IS DISPENSED WITH.

Telegraphic Address: "SCRUBBER MANCHESTER."



Further Particulars and Estimates on Application.

Three-Lift Spiral-Guided Gasholder, working in a Cast-Iron Tank made with planed joints, erected at the Longport Gas-Works of the Burslem Corporation. Bottom Lift, 90 ft. diameter and 20 ft. deep.

NOTHING SUCCEEDS LIKE SUCCESS.

Upwards of thirty Gasholders have now been erected or ordered upon this System; and their stability has been proved under the most varied conditions. A list of these will be sent on application.

The reader's attention is invited to the fact that our position as Makers of **SPIRAL-GUIDED GASHOLDERS, THE SAFEST AND BEST** of the several types of Columnless Gasholders, has not been modified by any recent adjustment of legal proceedings.

CARLESS, CAPEL, & LEONARD,

HOPE CHEMICAL WORKS, HACKNEY WICK, LONDON, N.E.,

NAPHTHA AND GASOLINE DISTILLERS AND PETROLEUM IMPORTERS,

Specially prepare GASOLINE, specific gravity ·650; CARBURINE, specific gravity ·680; or any other Hydrocarbon best adapted for Carburetting Gas.

Prices and Samples may be had upon application.

WILLIAM INGHAM & SONS,

Incorporated with the Leeds Fire-Clay Company, Ltd.,

WORTLEY FIRE-CLAY WORKS

Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON AGENTS:
O X O	"JACKSON"	BECK & Co.,
MARK.	CLAY CROSS.	130, ST. SUFFOLK ST., S.E.

GODDARD, MASSEY, & WARNER'S

IMPROVED

Sulphate of Ammonia Apparatus.

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICE APPLY TO

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms—

BURT BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
CHANCE BROTHERS, OLDBURY (Four Apparatus).
RUNCORN SOAP & ALKALI CO., Limited, RUNCORN.
NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited, SHADWELL.
WM. BUTLER & CO., BRISTOL.
KEMPSON & CO., Pye Bridge.

And to the following Gas Companies and Corporations—

ILKESTON.	BURY.	CHORLEY.
WIDNES.	BRIGHOUSE.	WHITEHAVEN.
HALIFAX.	MARKET HARBRO'.	CHESTER.
ALTRINCHAM.	PRESCOT.	SOUTH SHIELDS.
DENTON.	SOWERBY BRIDGE.	LEEK.
ST. ALBANS.	LEICESTER.	IPSWICH.
DUKINFIELD.	DARWEN.	BOURNEMOUTH.
NORTHWICH.	NELSON.	SALFORD.
HUDDERSFIELD.	ORMSKIRK.	LUTON.
		HAMPTON COURT.

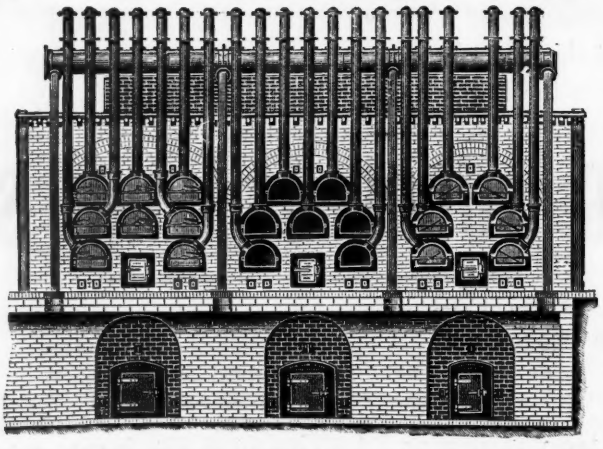
JONAS DRAKE & SON,

TELEGRAPHIC ADDRESSES
"DRAKESON, HALIFAX."
"ECLAIRAGE, LONDON"

TELEPHONE No. 43.
HALIFAX EXCHANGE.

GAS ENGINEERS,
CONTRACTORS,
IRONFOUNDERS,

BUILDERS AND ERECTORS OF EVERY DESCRIPTION OF OVENS, BENCHES, KILNS, FURNACES, &c.



RETORT SETTERS,
FURNACE BUILDERS
ETC., ETC.

REGENERATOR AND GENERATOR FURNACES ON DRAKE'S, FRITH'S, SIEMENS'S, KLONNE'S, HASSE'S, VALON'S, SOMERVILLE'S, PONSARD'S and other Principles.

INCLINED RETORTS

GASEOUS FIRING A SPECIALTY.

RETORT SETTING IN ALL ITS PRINCIPLES AND BRANCHES. BENCHES FITTED UP COMPLETE.
DRAWINGS, SPECIFICATIONS, AND ALL OTHER PARTICULARS ON APPLICATION.

LONDON OFFICE:
0, QUEEN VICTORIA ST., E.C.

OVENDEN, HALIFAX.

HEATHCOTE GAS COAL.

RICH IN ILLUMINATING POWER AND YIELD OF GAS.
ABOVE THE AVERAGE IN WEIGHT AND QUALITY OF COKE.
MAINTAINS A HIGH STANDARD IN RESIDUALS.

THE GRASSMOOR Co., Ld., CHESTERFIELD.

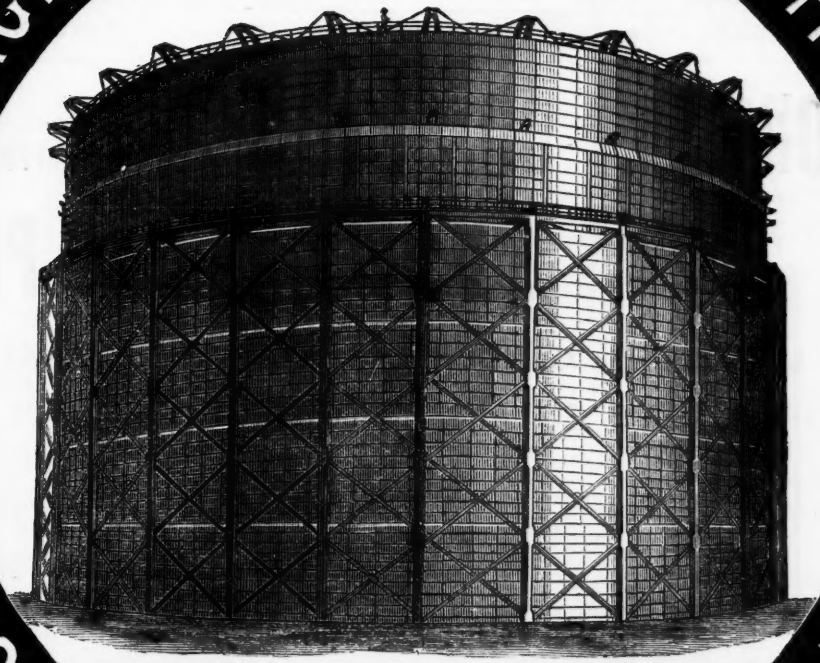
CLAYTON SON & Co LTD

MAKERS OF

WORKS LEEDS

GASHOLDERS OUR SPECIALITY

THE LARGEST GASHOLDER IN THE WORLD.



CAPACITY 12 MILLION CUBIC FT.

ERECTED AT EAST GREENWICH FOR THE South Metropolitan Gas Company
IT HAS SIX LIFTS 30 FT DEEP EACH AND IS 300 FT DIAM

MAKERS OF GAS PLANT OF EVERY DESCRIPTION

ROOFS PURIFIERS &c. ALSO

ADDRESS LONDON 60, QUEEN VICTORIA ST.
TELEGRAPHIC "GAS, LEEDS."

GASHOLDERS OF ANY SIZE

ERECTED & COMPLETED WITHIN 12 MONTHS AND AT THE TIME SPECIFIED

IMPORTANT TO ENGINEERS AND GAS COMPANIES.

A NEW CARBURETTOR FOR ENRICHING GAS IN BULK.

The Carburettors have been doing practical work for the past two years; in many cases doing all the enrichment without the use of Cannel or other rich Coals. The South Metropolitan Gas Company have these Enrichers at all their Stations. The Gaslight and Coke Company have had them in use at some of their principal Works for two years past; and several more are now being fixed at their other Stations. The Carburettors are also in use at several Suburban and Provincial Gas Companies' Works.

FOR PRICES AND FULL PARTICULARS, APPLY TO

THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,

18, DEVONSHIRE STREET, BISHOPSGATE, LONDON.

RETORT WORK

HORIZONTAL, INCLINED, REGENERATIVE, GENERATIVE, OR FLOOR-LEVEL SETTINGS.

J. & H. ROBUS,

ENGINEERS. AND CONTRACTORS,

MANSION HOUSE CHAMBERS, 20, BUCKLERSBURY, LONDON, E.C.

ARE PREPARED TO ENTER CONTRACTS

FOR EXTENSIONS OR RENEWALS OF THE ABOVE WORK DURING THE ENSUING SEASON.

PLANS, SPECIFICATIONS, AND ESTIMATES SUBMITTED

FOR EXTENSIONS AND RENEWALS OF EVERY DESCRIPTION.

Contractors for the Erection of Gas-Works complete, including Gasholder Tanks of all sizes and Main Laying.

THE HORSELEY CO., LTD., TIPTON, STAFFORDSHIRE.

MAKERS OF

GAS HOLDERS & GAS PLANT.

PURIFIERS, SCRUBBERS, CONDENSERS, WASHERS, TANKS, VALVES,

PIPES, LAMP PILLARS, RETORT-FITTINGS, ETC.

ALSO ALL KINDS OF

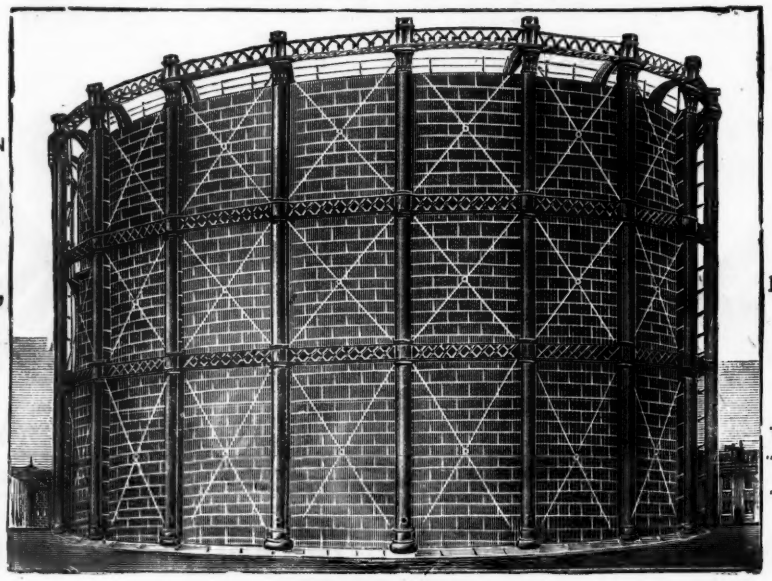
STRUCTURAL IRON

AND STEEL WORK,

BRIDGES,

ROOFS,

PIERS, ETC.



WORKS AND HEAD OFFICE:
TIPTON,
STAFFORDSHIRE.

LONDON OFFICE:
11, VICTORIA ST.,
WESTMINSTER.

TELEGRAPHIC ADDRESSES:
"HORSELEY, TIPTON."
"GALILEO, LONDON."

HARPER & MOORES,
STOURBRIDGE.

MANUFACTURERS OF

BEST FIRE-BRICKS, GAS-RETORTS,

LUMPS, TILES, AND ALL ARTICLES IN FIRE-CLAY.

Proprietors of Best Glasshouse Pot, Crucible, and other Stourbridge Clays.

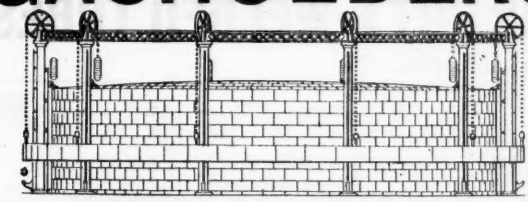
MANUFACTURERS OF GLASSHOUSE POTS AND CRUCIBLES OF EVERY KIND

ESTABLISHED 1836.

HENRY BALFOUR & CO.,
LEVEN, FIFE.

MAKERS OF

GASHOLDERS



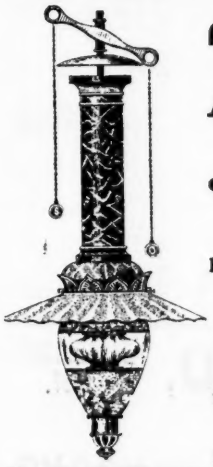
PRESSURE-REGULATORS FOR GASHOLDERS (See "JOURNAL" Dec. 20, 1892).

FOUR-WAY VALVES,

AND ALL CLASSES OF GAS APPARATUS.

HENRY PUPLETT, 47, Victoria Street, S.W.

The Climax of Regenerative Gas Lighting!!



THE

"VERTMARCHE"

A 280-CANDLE POWER

PLAIN IRON LAMP,

CLASS A— 55/-

LIGHT for LIGHT

less than half the price of any other Regenerative Lamp.

Manufactured in England by

HENRY GREENE & SONS,

153 & 155, CANNON STREET,

LONDON BRIDGE, E.C.

PARTICULARS AND PRICES FREE. AGENTS WANTED.

JOSEPH CLIFF & SONS,

INCORPORATED IN

THE LEEDS FIRE-CLAY COMPANY, Ltd.,

WORTLEY, LEEDS.

LONDON Offices & Depôts:

Baltic Wharf, Waterloo Bridge.

WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.

LIVERPOOL:

16, Lightbody Street.

LEEDS:

Queen Street.

MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

WILSON CARTER & PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

ADDRESS CHIEF OFFICES:

Temple Buildings, 50, New Street, Birmingham.

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

FLANGE PIPES FOR STEAM.

Sole Manufacturers of **LYON'S 'PATENT' GAS MAIN SYPHONS.**

AGENTS FOR

ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

TELEGRAPHIC ADDRESS "GAS LEEDS."

CLAYTON, SON, & Co.

LIMITED,

LEEDS,

MAKE

RETORT LIDS

OF ALL FORMS AND SHAPES IN IRON OR STEEL

BY SPECIAL HYDRAULIC MACHINERY.

LONDON OFFICE: 60, QUEEN VICTORIA STREET, E.C.

PRICES ON APPLICATION.

J. & W. HORTON

ETNA WORKS,

SMETHWICK,

NEAR BIRMINGHAM

(Established 50 Years),

PATENTEES

AND

MANUFACTURERS

OF

IMPROVED GASHOLDERS AND BOILERS

and Manufacturers of every description of

Gas Apparatus,

Cast and Wrought Iron Tanks, Purifiers, Condensers, Scrubbers, Retort-Lids, Cross-Bars and Screws, Wrought-Iron Boilers for Stationary, Portable, and Marine Engines, Sugar Pans, Coolers, Clarifiers, Punts, Boats, Bridges, Girders, Roofs, Cisterns, Oil-Tanks, Melting-Pots, Crucibles, Salt-Pans, Arch and Range Boilers, and every description of General Ironwork.

Drawings, Specifications, and Estimates supplied.

ESTABLISHED 1825.

GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

Crosbie's Manufactures have been supplied to the following Local Authorities and Gas-Works:—

ABERDOVEY.
ABERGAVENNY.
ALDRIDGE.
ANTRIM.
ARMAGH.
ASCOT.
BALLYMENA.
BENTHAM.
BIRMINGHAM.
BOGNOR.
BRAMHAM.
BRANDON.
BROADSTAIRS.
BROMSGROVE.
BURTON.
CARLOW.
CHESTERTON.
CLITHEROE.
COBHAM.
COVENTRY.
CRANBROOK.
CULLEN.
DEWSBURY.
DOWNPATRICK.
ELLAND.
ELLESMERE.
GARSTON.
GILLINGHAM.
GOREY.
HANLEY.
HENDON.
HINCKLEY.
HONITON.
HUNTINGDON.
ILKESTON.
IRTHLINGBORO.

Contractors to Her Majesty's Government and the Indian Government.

Contractors to the Turkish Government, The London County Council, and many Local Authorities.

Crosbie's Manufactures have been supplied to the following Local Authorities and Gas-Works:—

KEGWORTH.
KILDWICK.
KILRUSH.
KIRKBURTON.
KNUTSFORD.
LEEK.
LEVEN, N.B.
LIMERICK.
LONDON COUNTY COUNCIL.
LYMINGTON.
MERTHYR TYDVIL.
MILBORNE PORT.
NORTH MIDDLESEX.
PENMAENMAWR.
PEMBROKE.
PORTADOWN.
PORTRUSH.
PORTSMOUTH.
RAUNDS.
ROCHESTER.
RUGELEY.
SEAHAM HARBOUR.
SHIPSTON-ON-STOUR.
STAFFORD.
STAMFORD.
STROUD.
SUDBURY.
SWINTON.
UTTOXETER.
VENTNOR.
WARWICK.
WEXFORD.
WIGSTON.
WITNEY.
WOLVERHAMPTON.
WORKINGTON.

CROSBIE'S PAINTS.

GUARANTEED GENUINE AND FREE FROM ADULTERATION.

GUARANTEED GENUINE AND FREE FROM ADULTERATION.

CATALOGUE AND TESTIMONIALS ON APPLICATION.

ADOLPHE CROSBIE, LTD.,

Colour Works, WOLVERHAMPTON.

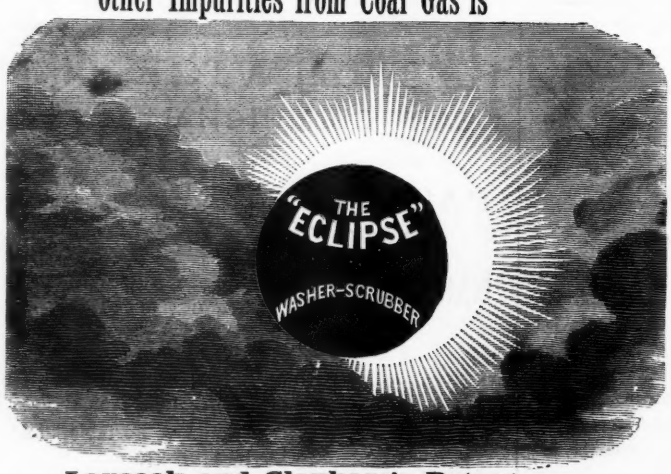
CLAPHAM BROTHERS, LIMITED,

ESTABLISHED 1837.

The most efficient Machine known for extracting Ammonia and other Impurities from Coal Gas is

KEIGHLEY, YORKS.

WELLINGTON, NELSON, & MARKET ST. WORKS.
Telephone No. 2235.
Telegraphic Address: "CLAPHAM BROTHERS Keighley."



Laycock and Clapham's Patent.

The Patent Wooden Balls thoroughly break up the Gas; give an immense amount of freshly-wetted Surface; and do not clog or increase back pressure.

Whilst the Gas is passing through and amongst the Balls, it is continually showered upon by the contents of Buckets.

The Shaft Revolves in Improved Bearings, and all Workings are accessible.

REPAIRS AND TROUBLE REDUCED TO A MINIMUM.

MAKERS OF

PURIFIERS,

With Lutes Cast and Planed Joints,

CONDENSERS,

VALVES.

MAINS,

RETORT-FITTINGS.

London: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Aug. 1, 1893.